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ABSTRACT

This report is one of a group of papers examining curriculum issues related to science education courses at a Swedish university. Symbolic interactionism and symbolic interactionist ethnography have informed the research strategies in these investigations. The paper focuses on curriculum development from the actor's perspective. To evaluate a natural science course, interviews were conducted with 18 science education students and six teacher educators. Respondent-validated texts were developed from the interview data for each participant to determine his or her viewpoint about the course. Of particular interest were the views of teachers and students about changes in the teacher education program. Although a broad perspective was a stated aim at the policy level, in actual practice the course was divided into a series of topics, and students had difficulty gaining a broad view. The holistic approach anticipated in planned reforms did not materialize in the course as taught. Students questioned the relevance of some course material to the teaching they would be doing. The report is in English and is preceded by a Swedish summary. A 95-item list of references is included. (SLD)

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"POLICY MAKING":
A Study of Curriculum Development in Contemporary Teacher Education

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Report 1990:02
Institutionen för pedagogik
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Abstract

Symbolic interactionism and symbolic interactionist ethnography have informed research strategies connected to the evaluation of the new compulsory school teacher education programme at a Swedish University in the following ways.

(1) Symbolic interactionism, as a perspective on society, has informed methodology and aided the articulation of research strategies.
(2) Symbolic interactionist ethnography was selected as the most suitable (suitably eclectic) research strategy available for persuing the research that the researcher had in mind.
(3) Participant observation of linked micro-settings (Hargreaves, A., in Burgess, R. G., Issues in Educational Research) was introduced into the framework of the research so that (a) the research perspective could be widened and (b) the effects of decisions made by actors in different settings in different parts in the total system could be observed as they impinged on the lives of actors and the daily events of settings at other parts of that system.

The academic year of 1988/89, as the year when the first "all age" compulsory school teacher education programme was introduced, represents a milestone for teacher educating in Sweden. This report is one of several produced at the university of Gothenburg which focus on the early stages of the programme of teacher education. This particular investigation centers upon the implementation of a natural science course at a University named Baysfield by the researcher.

The data reported on here pertains to an interview investigation which involved in depth open interviews with eighteen science education students and six teacher educators at Baysfield. Respondent validated texts (Beach, 1989) were developed from the interview data. The purpose behind the investigation was the unearthing of the conceptions about this course which this group of participants hold.

The report is in English and is preceeded by a Swedish summary.

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Svensk Sammanfattning

Följande rapport ingår i en rapportserie som granskar utvecklingen inom svensk lärarutbildning sedan 1985 års lärarutbildningsreform. Rapporten bygger på ett material som har samlats från intervjuer med lärarutbildare och studenter vid en av linjerna inom svensk lärarutbildning; Grundskollärarutbildningen. Samtliga intervjuade var inblandade i en och samma kurs vid grundskollärarutbildningen vid ett universitet i Sverige, ett universitet som här kallas "Baysfield".

Den kurs som studeras är av en ny sort, speciell för grundskollärarutbildningen vid Baysfield. Den är särskilt intressant genom att denna sorts kurs inte har drivits vid någon utbildning i Sverige förut, samt att den är en NO-kurs för blivande lärare som bygger på samtliga NO-discipliner och försöker integrera dessa under ett antal olika teman. Kursens innehåll skall också integreras med skolans vardagsverklighet genom didaktiska moment och fält-studier som ingår i kursen. Kursen skall därför utgöra en sammanhållen enhet som bygger på den samlade kunskapen hos ett antal olika lärarutbildare från olika institutioner vid universitetet vars lärarutbildarerfarenhet är spridda med avseende på både disciplin och stadieinriktning. På så sätt är kursen en försöksverksamhet där olika discipliner och lärarutbildningstraditioner möts. Dessa kulturmöten kan, enligt symbolisk interaktionistiska antaganden, ge värdefull inblick i vilken sorts rationalitet som kommer att ligga till grund för grundskollärarutbildning under kommande år. Kursen, och därmed även universitet, har valts till studieobjekt på grund av dessa teoretiska antaganden. Undersökningen har bedrivits från den symboliska interaktionismens metodologiska utgångspunkter (see Blumer, 1956, 1967).

Undersökningens övergripande syfte och allmänn inriktning

Denna rapport ingår i ett projekt som granskar grundskollärarutbildning. Projektet har ett antal olika moment men ett huvudsyfte är att bedriva ett kritiskt och oberoende studium av hur den påbörjade grundskollärarutbildningen förhåller sig till samhälleliga förändringar i övrigt. Hur den pågående grundskollärarutbildningen förhåller sig till nyckeldokument (policy-documents) uppmärksammas särskilt. Ett antal centrala reformaspekter har valts ut som tycks vara av särskilt intresse. Grundskollärarutbildningens sammanhållning, dess didaktiska inriktning, det specialpedagogiska momentet, och dess forskningsanknytning. Tillsammans med det lokala arbetets särskilda prägel vid Baysfield uppmärksammas två av dessa i denna rapport.

1. sammanhållning; grundskollärarutbildningen är en linje som bör präglas av samma mål, samma organisation, samma regelsystem och samma synsätt, oavsett ämnesspecialisering och fördjupning. Undersökningen visar framförallt att det sistnämda inte kan uppfattas skett. Utan att de intervjuade lärarutbildare utifrån vissa perspektivser väldigt olika på, framförallt hur lärarutbildningen bör gå till och har arbetat utefter dessa iéer i första hand.

2. Didaktik; den specifika lärakompetensen kallas detta moment. Didaktik betonas starkt i alla nyckeldokument men tolkas ändå olika av lärarutbildare. Didaktiken rymmer frågor kring (val av) stoff i

undervisningen. Denna rapport uppmärksammar hur värdeladdade tolkningar tränger in i hur lärarutbildare ser på innebörden i detta.

Reform politiska aspekter uppmärksammas också i rapporten. Detta genom att man analyserat innehållet utifrån två övergripande perspektiv på lärarutbildning. Ett tekniskt perspektiv och ett moral-politiskt perspektiv. Det sistnämnda har två delats till underordnade ett "grön-politiskt" och ett "reform-politiskt" perspektiv. Det framgår av rapporten att skillnader deltagare emellan i frågan om synsätt på lärarutbildning och lärarutbildningsförändringar maximeras inom det tekniska perspektivet och minimeras inom det moral-politiska. Detta har långtgående konsekvenser för blivande lärares kritisk reflektion.

Rapporten ingår i en serie som försöker utvärdera de fenomen som träder fram i utbildningen. I denna rapport uppmärksammas de ovannämnda fenomen som de framträtt i en kurs vid ett universitet. Centralt i detta arbete har varit hur de studerande och de lärarutbildare som tillfrågats upplevt utbildningen, såväl dess övergripande mål, som dess vardag i den kurs som särstuderats.

Tidigare rapporter inom denna serie (Beach 1989, Wernersson 1989) har granskat grunskollärarutbildningens hittillsvarande verksamhet vid Göteborgs universitet. Båda dessa rapporter uppmärksammar uppfattningar om lärarutbildningsreformen och om hur dessa varierar bland lärarutbildare och studenter, både i termer av reformens innebörd samt hur den kommer att leda till en förbättrad verksamhet. Denna rapport avser granska dessa fenomen närmare. Rapporten presenterar och analyserar, genom "respondentvaliderad textanalys" (Beach 1989), de intervjuades "lärarutbildningsideologier" samt försöker visa hur dessa tränger in i lärarutbildningens kursutveckling (curriculum development). Undersökningen kan kanske ses som ett av flera försök att kartlägga utbildningens utvecklingsprocesser efter decentraliseringen genom den reformerade lärarutbildningens förverkligande. I detta fall är det lärarutbildare och studenter som "kursutvecklare" (curriculum developers) som står i fokus.

Undersökningen fokuserar särskilt på sex medlemmar i det läralag som har arbetat med kursen, fyra didaktiker (Chris, Anne, Tom and Maureen) och två ämnesteoretiker (Bill och Dave). Sammanfattningar av de respondentvaliderade texter som utarbetades efter interjuer presenteras i rapporten. Sammanfattningar av fem sådana texter som utarbetades efter studentintervjuer ges också. Detta för att ge läsaren en uppfattning av vilken typ av material som ligger till grund för en stor del av analysen i denna undersökning.

Genom att utgå från den symboliska interaktionismen som metodologisk underbyggnad måste undersökningen närma sig sin analytiska uppgift genom de intervjuades subjektiva rationalitet (subjective rationality). Undersökningen måste då uppfylla vissa krav. Framförallt i det att de tolkningar av skeenden och påståenden som görs passar in med aktörernas egna "världsbilder" (subjective world models) på ett ytterst lämpligt sätt. Undersökningen måste (a) tränga in bakom de intervjuades synnpunkter för att ta fram rationaliten bakom utsagorna; **"The Appreciative"**, (b) få grepp om det "för givet tagna" genom att tillföra en begreppsapparat och ett analytiskt språk; **"The Designatory"**, (c) kartlägga de intervjuades versioner av refererade händelser; **"The Reflektive"**, (d) ge förståelse för utbildningsorganisationen "grundskollärar-utbildning" vid Baysfield, så att aktörernas beskrivningar kan förstås i sitt rätta sammanhang; **"The Immunological"**, samt (e) motverka "makro-teorins" tendenser till förenklingar; "The Corrective", (se Beynon 1985). Öppna intervjuer tillsammans med förberedelsen, fastställandet och analysen av respondentvaliderade texter, anses ge goda möjligheter att tillmötesgå den symboliska interaktionismens krav i detta avseende. Eftersom de blivande lärarnas yrkeskompetens rimligen bör vara centrala för en lärarutbildningsundersökning har "Yrkesreflektion" (professional reflection), "Yrkesideologi" (professional ideology), "Pedagogisk övertygelser" (pedagogical convictions) och "Professionalism" (professionalism), blivit centrala begrepp i analysen.

Kursplanen och kursens innehåll och uppläggning

Kursen kallas i rapporten för "The Physical World" och består av tre ämnesövergripande teman; "The Earth and Universe", "Energy" and "Matter". Dessa tre teman fungerar som "organisatoriska rubriker" i kursplanen, och kursens innehållsbeskrivning sker genom ett antal underrubriker till var och en av dessa kategorier. Kursplanen saknar faktiska beskrivningar av vad undervisningen skulle innehålla. UHA begär att en kursplan skall finnas för samtliga kurser som ges vid Svensk högskola. UHA ställer också krav på hur dessa kursplaner skall se ut. Denna aktuella kursplan avsåg uppfylla UHAs krav och fastställdes av Baysfields Linjenämd i läsårets 1987/88 slutskede.

Dessa något enkla påpekanden har långtgående konsekvenser för hur kursen kom att se ut. Kursplaner skall vara styrande för kursutveckling (curriculum development) och är därför av betydelse för hur kurser blir. Undersökningen visar på hur detta gått till på en kurs. En tolkning av regeringspropositionens synpunkter på kursplaner gjorde kursplanegruppen. Den kan sammanfattas i följande citat.

> "Vi tolkade regeringspropositionen i dessa avseenden menar att en balans skulle uppnås i kursplaner mellan frihet och styrning. ..Enligt våra uppfattningar innebär detta att kurser skall vara målstyrda och att kursplanen skulle lägga fram de övergripande målen för kursen samt ge ledtrådar för kursens utveckling och ett (tänkt) innehåll. ..En viss frihet skall ges lärarutbildare att utveckla kursens innehåll i (samråd) med studenter. ..Lärarutbildare skall kunna bidra med sin kompetens till kursens utveckling, kursen skall inte vara för färdig, så att säga."
>
> ...En bra kursplan ger i grova drag ett intryck av vad som avses med kursen ...läraren skall bidra med detaljerna i detta och planera undervisningen efter eget huvud tillsammans med studenterna. ...Enligt vad jag förstått av vårt samtal idag är Vi alla överens om att detta är en mycket bra kursplan i dessa avseenden."

Enligt ovanstående är vad som kan tänkas ha skett inom lärarutbildningen att So's mål för kursutveckling (curriculum development) i grundskolan har föverkligats i lärautbildningen genom att grundskollärarutbildningen blivit målstyrd. Det är en form av decentralisering som sker där en väl organiserad lokal byråkrati uppstått för att "ta hand om" utbildningen. Linjenämden och universitetsstyrelsen, bestämmer -inom UHA's och högskoleförordningens ramar- hur denna byråkrati skall se ut samt hur mycket "styrande" den skall eftersträva.

Kursens målstyrda karaktär skall enligt regeringspropositionen balansera lärarutbildares och studenternas frihet att utveckla "sin" utbildning mot den kontroll som staten måste utöva på utbildningen av kommande generationer kunskaps-kontrollanter för dess skolsystem. Som regeringspropositionen påpekar är grundskolan en väsentlig komponent i samhällets reproduktionsmekanism. Denna frihet utformas, enligt citat, genom att lärautbildare och studenter tillsammans får tillfälle att diskutera kursens mål, planera vad som skall ingå i kursens olika moment samt hur utbildningen skall läggas upp. Detta explicitgörs även i regeringspropositionen. Föreliggande undersökning visar dock, att denna "diskussion", av en eller annan anledning, inte blivit av. Den visar också att den ämnesintegrering som eftersträvdes aldrig uppnåtts.

Undersökningen ger indikationer på hur kursen har pendlat mellan olika innehåll, olika uppläggningar och olika utvecklingsformer. Den visar också att de inblandade har haft avsevärt skilda uppfattningar om hur olika föreskrivande dokument (kursplan, lokalplan, nationalplan och reg.prop.) skulle tolkas, samt vad dessa rekommendationer betyder för konkret handling. Till exempel har stoffet under ett moment utvecklats utan de studerandes medverkan och kommit "mot" dem utifrån ämnet för att i nästa undervisningspass vara ämnesmässigt obestämt även totalt öppet och kräva studenternas aktiva medverkan. I första fallet har tillfälle till diskussion mellan studenter och lärarutbildare inte givits. I det andra fallet verkar studenterna inte ha accepterat det erbjudna tillfället. Antingen för att de inte förstått vad som krävdes av dem eller för att de har förkastat idén med aktivt deltagande och föredrar att "ledas" in i sin lärarroll. Studenterna verkar av olika anledningar inte vara mogna för det som krävs av dem inom en utpräglad "att lära sig lära andra" filosofi (learning to teach philosophy, Gunstone et al. 1987 mm.). Medan studenterna verkar vara beredda att medbestämma hur undervisningen skall läggas upp antyder undersökningen på att de är mindre benägna att bestämma vad de skall studera under sin utbildning.

Yrkesreflektion

Professionalisering kan innebära uppkomst, fördjupning eller förstärkning av ett yrke och eller en yrkeskår (Holgersson, 1985) där alla kräver eller resulterar i ett ändrat medvetande hos den som utövar yrkesarbetet men eftersom läraryrket inte är nytt och har redan fördjupats med ett antal inriktningar är det sistnämnda av dessa tre det jag antar menas ske genom den nya grundskollärarutbildning. Inom yrkesförstärkning kan två inriktningar spåras som antagligen är både ömsesidigt beroende och ömsesidigt förstärkande.

Å ena sidan kan en yrkesförstärkning vara medvetet utåtriktad där det ökade medvetandet är till för att förbättra yrkes-utövning mätt ifrån klientens utgångspunkt och perspektiv. Å andra sidan kan yrkesförstärkningen vara medvetet inåtriktat på yrkets maktställning. I detta fall ställs professionalis-eringskrav för att förstärka yrkesutöverens eller yrkets maktställning eller status i samhället, relativt andra grupper. I sista fallet är det inte nödvändigtvis yrkesutövning mätt ifrån klientens perspektiv som beaktas men i båda fall försöker ändå yrkesutövararen att på något sätt förutse de logiska konsekvenserna av sin handling samt på något sätt följa upp det faktiska handlandet för att utvärdera det uppnådda resultat gentemot det han eller hon förutspådde. Det är detta sistnämnda slags kognitiva beteende som jag avser med beteckningen yrkesreflektion.

Att producera kullar av professionella, reflekterande lärare för landets grundskolor är ett formellt mål för grundskollärarutbildningen, men vad som menas med detta rent konkret finns ingen entydig uppfattning om vid Baysfield. Uppfattningarna varierar beroende på yrkesutövarens maktstatus inom lärarutbildningshierakin, institutionstillhörighet mm. Dvs beroende på individens i fråga personliga utbildningsideologi eller möjligen gruppidentitet. Även vem eller vilken organisation läraryrket betjänar är omtvistat i lärarutbildningen. Man är både statstjänsteman och upprätthållare av den enskilda individens (elevens) integritet. Alltså dessa två ibland motsatta intressegrupper skall tillfredställas samtidigit.

Vad som generellt verkar uppfattats som det väsentliga i samband med yrkesreflektion i dessa avseenden, särskilt men inte enbart av ämnesteoretiker, summeras i följande citat från en representant för en av de ämnesteoretiska institutionerna vid Baysfields universitet vid ett planeringsmöte förra året.

> "Vad studenterna skall kunna reflektera över är förhållandet mellan de ämneskunskaper de får här och det de sedan kommer att undervisa om i skolan samt hur eleverna förstår väsentliga begrepp inom ämnet och hur man som lärare, kan hjälpa sina elever förstå bättre.
> ...Hur ett ämne har utvecklats (historiskt sett) samt hur ämnet är i förhållande till samhället är säkert mycket intressant men inte någonting som en blivande lärare måste kunna, eller hur. ...Vad de behöver kunna i första hand är de etablerade och väsentligaste fakta inom ämnet."

Respondentvaliderade texter, och även de textsammanfattningar som finns i rapporten, visar att denna sorts kursutvecklar-subjektivism inte inskränker sig till enstaka kursutvecklare utan är någonting som är generellt. Det är i kursutvecklarens subjektivitet eller undervisningsidéer (curriculum idealism) som kursplaneringen börjar ta form och det är här som möjliga yrkesreflektioner inskränks. Kursutvecklarnas idéer om undervisning i denna kurs har inskränkt sig till manipulerbara undervisningsfaktorer. Lärarutbildare och studenter har inte funderat till exempel över vad skolan är, vad ämnena är och vad undervisningen inom ämnena, historiskt och i nutid, syftat till. Dessa idéer har utgjort både möjligheterna (särskilt i det att det har funnits fler olika) och begränsningarna (i det att dessa inte är bundna till skolan utan till en idévärld) för kursutvecklingen. Den är också ett av de starkt konservativt element som har propagerat för bibehållande av den gamla lärarutbildningens undervisningstraditioner inom den nya lärarutbildningen.

Skolan verkar ha blivit mycket fragmentariskt representerad i kursen genom den inkonsistens som funnits på grund av de ovan refererade omständigheterna. Var och en av lärarutbildarna har givit sin version av vad undervisning och kursutveckling inom ämnet (ämnesblocket) skall bestå av. Ämnena själva har fått en snäv disciplinbunden avgränsning i denna process. Detta har försvårat förståelsen av vad ett ämne egentligen är och vad undervisning i allmänhet, och inom de tradionella naturvetenskapliga disciplinerna i synnerhet, syftar till. Med andra ord har kandidaterna inte beretts en möjlighet att se sin framtida roll som ämneslärare (eller ämnesspecialist i grundskolans lägre årskurser) från mer än ett mycket snävt perspektiv. Såväl skolan som ämnena och ämnesundervisningen har framträtt som apolitiska och ahistoriska företeelser trots de dynamiska politiska drag som kännetecknar dem historiskt sett.

Vad skolan synes göra (och har gjort i alla tider), enligt undersökningar på både mikro- och makronivå (se till ex. Willis 1977 och Carnoy och Levin 1976), är att socialisera ungdomen till bestämda uppfattningssätt som framhäver en viss social ordning (social order).

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Denna ordning skall helst ses båda som mer rättvis och mer naturlig än tankbara alternativ. Skolan har till uppgift att etablera en "psyko-social hieraki" som kan stå till grund för urval till olika samhällspositioner. Skolan skall rättfärdiggöra de klyftor av olika slag som finns i samhället och mellan samhällen. Denna kurs ifrågasätter inte en normativ beskrivning av Sverige som västerländsk demokrati och dess skolsystem som ett rättvist samhällsinstrument. Den betonar envist vikten av "individualiserad undervisning i ämnena" och "experimentella arbetssätt" osv., istället för att ge ämnena en framskjuten position i en samhällskritisk under-visning i ett försök till att **ge mer bredd till** blivande lärarens möjligheter till kritisk reflektion. Detta bidrar till en konservering av normativa föreställningar i nästa genera-tionen lärare och därmed hos många fler elever. Observera följande uttalande som gjordes av en av Baysfields lokal-byråkrater, en specialpedagog med en ledande befattning inom sin institution.

> "(Det specialpedagogiska momentet) är en av de tyngsta punkterna i reformen. ...De studerande måste bli medvetna om att eleverna är olika (och att) ...skillnader i elevernas prestationer är att förväntas. ..Dessa skillnader är naturliga men kan påverkas genom hur (till ex.) stoffet väljs och undervisningen bedrivs."

Demokrati och professionalism

Den här presenterade undersökningen tyder på att kursen (The Physical World) är snäv i sitt förhållningssätt till yrket där framförallt skolans politiska drag har gjorts osynliga för studenterna. Lärarens roll att uppfostra "demokratiska medborgare" (Englund, 1986) träder aldrig fram i kursen, där undervisningen presenteras som någonting som handlar i alltför hög grad om ämnena och ämneskunskaper. Men även ämnenas karaktär är vridna åt ett alltför "objektiv" (Beach, 1989) uppfattning om teorier och kunskap. Något som avskärma undervisningsyrken ifrån sina socio-politiska inramningar å ena sidan och ämneskunskaperna ifrån de politiska sammanhang de har växt fram i å den andra. Detta slår hårt emot de uppfattningar som skapas av den organiserade undervisningens och ämnenas historiska förlopp. Dessa träder fram som samhällsinsatser till individens nytta i första fallet och individinsatser till samhällets nytta i det andra. I de fall där en historisk bakgrund ges till kunskapens framväxt inom ämnesdisciplinerna till exempel, är den apolitisk och dekontextualiserad till någon form av historisk individualism där vetenskapsmannen som ensam varg (till ex. Newton eller Einstein) och hans stora tankar betonas och jämförs med någon annans, oftast tidigare och oftast mer naiva uppfattningar.

Detta har negativa konsekvenser för studenternas kunskapsbild. Denna är ofta redan "objektiv" (Beach, 1989) men genom denna sortens undervisning blir den sannolikt mer så. Visserligen bör mänsklighetens alla intellektuella aktiviteter inte reduceras enbart till försök att upprätthålla en viss social ordning, men när man avskärmar "kunskap" från dess politiska och historiska rötter, något som undersökningen antyder är fallet i lärarutbildningen, görs dessa aktiviteter obegripliga. Vilket är just vad kursen verkar har gjort för studenterna. De enskilda ämneskunskaperna har varit tekniskt sett mycket bra men har haft negativ inverkan på studenternas kunskapsuppfattning eftersom de har dolt ämnenas sociologiska och socio-politiska karaktär. Didaktikens och specialpedagogikens envisa betoning av manipulerbara undervisningsfaktorer och individinriktade undervisningsinsatser har också snedvridit kandidaternas yrkesuppfattningar.

Risken är att studenterna får svårt att förstå vad lärare egentligen gör (det som de själva kommer att hålla på med) från annant än ett snävt ämnesbundet perspektiv. Något som gör deras vidare reflektioner över dessa aktiviteter mycket snäva. Den yrkesreflektion som rimligen skulle kunna uppstå i denna kurs kommer, enligt vad denna undersökning funnit, att enbart vara funderingar över ämnesstoffet och dess behandling i förhållande till de "psykologiska" inlärningskaraktäristika som kännetecknа målgruppen. Professionalism kommer i så fall att inskränka sig till **tekniska** frågor kring hur man manipulerar kända undervisningsfaktorer i sin undervisning och till funderingar kring vilka faktorer är mest påverkbara. Men om man ser till grundskolans läroplan (lgr 80), där professionalism inskränkas till hur lärarna möjligen kan anamma demokratins krav i sin undervisning, motsvara detta strävan att upprätthålla samhällets demokratiska väderingar i skolan. Det är på detta sätt begreppet "professionalism" träder fram i samtal med både studerande och lärautbildare.

"Policy-making"

Trots en intention om studentmedverkan i kursutvecklingen har kursinnehållet (ibland) förberetts och "levererats" utan att studenterna har tillfrågats. Man har då inte heller haft någon kunskap om studenternas uppfattningar om dessa moments "vad-" och "hur-" komponenter. Det är inget overraskande konstaterande att kursen i sådana fall har "iordninggjorts" helt blint för studenternas studieförutsattningar. Istället har planering styrts av oreflekterade antaganden om studentgruppen hos kursansvariga.

Med utgangspunkt i kursplanen skulle man kunna tro att kursutveckling skulle vaxa fram enligt enhetliga kriterier. Analys av de respondentvaliderade texterna visar att detta är långt ifrån fallet. Snarare har kursansvariga saknat en gemensam uppfattning om vad kursplanen innebär och kursen har pendlat fram och tillbaka med en intern logik som till stor del präglats av de(n) ansvariga lärarutbildaren(na)s personliga lärarutbildningsideologi. De viktiga nyckeldokumenten (policy documents, kursplan, utbildningsplan, lokalplan och regeringspropositionen etc.) har inte fungerat som en obestridd mall för kursutveckling. Snarare verkar det vara så att olika kursutvecklare och/eller kursutvecklargrupper har "laddat dessa dokument med egna värderingar" för att sedan kunna manipulera policyn så att den bättre passar in i de egna förutfattade meningarna om vad som utgör en gedigen ämnesstudiekurs för grundskollärarutbildningen. Det är kort sagt en upp-och nervändning av vad som skall ske i policyimplementering enligt förekommande organisations- och systemsteoretiska uppfattningar. Enligt vissa forskare finns denna sorts manipulerande kring policyreleterade frågor alltid och gäller därmed inte enbart för de lärarutbildare som är kopplade till denna kurs.

Studenternas motstånd och deras avvisande av idéer

Studenternas motstånd och de idéavstötningar som de ibland anklagas för kan ses som en form av "förhandling" (negotiation) och ett exempel på ett "manipulerande beteende" liknande det som de andra kursutvecklarna anvander. Vad som då blir kursinnehållet är en kompromiss mellan lärarutbildaren(na)s idéer och studenternas reaktioner på de konkreta uttrycken som dessa tar i undervisningen. Negativa uppfattningar har mer uppmärksammad inverkan på riktningsförändringar. Det är därför negativa attityder känns och syns mest.

Särskilt Anne och Tom verkar ha utsatts för kritik och motstånd och just Annes och Toms framställning av hur kursen varit för dem visar tecken på att de modifierat sitt kursinnehåll något under kursens gång. Ibland kanske mot sitt bättre vetande, trots att modifieringar av detta slag verkar kunna ingå som en naturlig del i deras undervisningsideologi. Studentmotstånd har utgjort en modifieringskraft på kursen; särskilt i vissa moment. Studenterna; delvis på grund av en yrkesidealism som grundas i sympatisk introspektionism under sina skolgång, där de projicerat sina uppfattningar om läraryrket genom olika rollfigurer från skolans lärarkår (Blumer, 1928 i Hammersley, 1989 och 1989a), och är väldigt presentistiskt orienterad; verkar ha sökt ett mer ortodoxt förhållande mellan ämnesteori (subject studies subject theory) och ämnesdidaktik (subject studies curriculum theory) än Anne och Tom ville ge. Studenterna verkade vara mer tillfreds med en ämnesdidaktik som rättfärdigar den ämnesteori de får i andra delar av kursen. Anne och Toms lärarutbildningsideologier och därmed deras stoffurval och "metodik" ligger längst ifrån detta studentideal bland lärarutbildarna på denna kurs.

De negativa attitydernas karaktär

En tidigare rapport (Beach 1989) uppmärksammade bland annat negativa attityder som några NO- och MaNO- studenter vid Göteborgs Universitet utvecklade mot introduktionskursen på grundskollärarutbildningen. Av särskild vikt för de negativa attityderna i detta fallet var två aspekter av kurens egen didaktiska vardag. Å ena sidan lyftes organisatoriska aspekter av utbildningen fram där enskilda lärares sätt att organisera stoffet kritiserades, medan det i andra fall var kursens ideologiska utgångspunkter som studenterna satte sig emot. Även i denna undersökning verkar dessa två faktorer allmänt dominerat studerandenas motstånd till kursen. Eftersom kursen har svängt som den har är de olika uppfattningar bland studenterna, till olika delar av kursen, som kommer fram i undersökningen ingen överaskning.

Inte alla studenter förkastade Annes och Toms försök att upprätthålla och rättärdiga en mer "konstruktivistisk" undervisning. Särskilt studenter som sökte mer ansvar för sin utbildning och som samtidigt var mer benägna att godta en mer "sociologisk" kunskaps syn verkade ha det lättare att genomskåda Anne och Toms undervisningsintentioner och därmed förstår dem och till och med godta dem (se även Beach 1989).

Vissa i studentgruppen ställde på huvudet det tämligen vanliga antagandet vid Baysfield att ämnesdidaktik skall rättfärdigöra all ämnesteori i utbildningen. Istället hävdade de att ämnesteoretikerna skulle se till att ämnesteorin rättfärdigade sig själv. I likhet med Morrison (1989) verkar dessa studenter ifrågasätta om de abstrakta begrepp som förekommer vid högre utbildning är av värde för en lärares yrkesutveckling. Om inte de begrepp som behandlas i låg- och mellanstadiet och universitetsnaturvetenskap har gemensamma nämnare, är "högre studier" av tämligen ringa (eller tom negativ) betydelse för en tidig-lärares yrkesutveckling, anser denna grupp studerande. Antagandet att mer och bättre ämnesteori bidrar till en automatisk förbättring av undervisningskvalitén i grundskolans mittersta årskurser diskuteras tämligen ingående i rapporten.

Det stoff som studenter i allmänhet verkar ha tyckt bäst om var "kemistoffet" som utvecklades av Chris Page och Maureen Odin. I detta block hade lärautbildarna integrerat stoffet utifrån det perspektiv i grundskolans läroplan som betonar ett stoffs vardagsnärhet och orienteringssyfte. Både ämnes-didaktik och ämnesteori inspirerades av vad detta dokument har att säga om NO-undervisning påstod man. Ämnesteori och ämnesdidaktik (som en sorts ämnesmetodik) var integrerade av lärarutbildarna som ett stoff som var läroplansenligt både i val och behandling av innehåll. Stoffets anknytning till skolan kunde därmed lätt identifieras och uppskattas av studenterna och därmed överbryggdes de kognitiva och yrkesreleterade glapp mellan ämnena i skolan repektive högskolan som drabbar mer abstrakta ämnesteorier. Ämnesteorin var möjlig att motivera genom en ämnesdidaktik som uppträde i den form studenterna helst vill ha, dvs. i form av konkreta exemplen på hur man kan utforma NO-undervisningen i grundskolan.

Det finns förstås svagheter med denna direkta tillämpning av grundskolans läroplan och, som vissa studenter påpekade under intervjuer, denna form av direkt undervisning om hur man kan göra. Det finns en fara i att studenterna uppmuntras vara alltför passiva och ta på sig en yrkesroll istället för att utveckla sitt yrkesjag. Chris och Maureens stoff är också normativ och de behandlar lika lite som andra lärare på kursen politiska och socio-politiska frågor i samband med ämnes-stoffet. Chris och Maureens stoff kan formodligen leda till en mer tillgänglig undervisning än den nuvarande på grundskolans högstadiet och är darigenom potentiellt radikaliserande om studenterna kan göras medvetna om varfor detta är så. Studenternas positiva bedömning av detta innehåll kanske har sin grund i en uppskattning av dessa möjligheter? Men, eftersom många (de flesta?) av dem även bedömer allt annat ortodoxt innehåll (framst den abstrakta ämnesteorin) positivt tyder kanske detta på att de som kollektiv ännu saknar politisk och professionell mognad. Faran är att de inte heller kommer att få något bidrag i denna riktning från en grunskollärarutbildning som är för normativ och för tekniskt inriktad.

Ämneskunskaper och undervisningsfärdigheter

Det stoff från kursen som ännu inte behandlats i denna sammanfattning är de ämnesteoretiska inslag som utvecklats av två ämnesspecialister från Baysfields tekniska högskola (Baysfield University of Technology). Trots att det fanns skillnader mellan de tillvägagångssätt för kursutveckling som dessa utbildare antyder att de utnyttjat, vilar båda på samma sorts antaganden om de naturvetenskapliga begreppens universalism (universality of concepts) som normativ naturvetenskaplig undervisning bygger på. Enligt vad denna undesökning kommit fram till gick kursutveckling inom de ämnesteoretiska moment till på följande sätt.

(1) Undervisningen ordnades i förväg genom att ett lämpligt innehåll, som syftar till att förklara ett bestämt förhållningssätt till omgivningen (det naturvetenskapligt riktiga), idententiferades.
(2) Strategier som gjorde kommunikation av detta möjligt upprättades.
(3) All undervisning gick därmed ut från det naturvetenskapligt etablerade och all inlärning riktades mot dessa förståelseformer.

Denna undervisningsform motsvarar den traditionella ämnes- eller disciplinscenterade och betonar att väsentlig kunskap finns enbart hos disciplinerna samt vidare att all undervisning darför skall syfta till förståelse av disciplinen. Ämnesteorin hävdas i kursen alltså för den goda kunskapens skull men även för att man anser att ämnesundervisning kan uppnå andra mål som är centrala för lärarutbildningen och har att göra med blivande lärarens yrkesutveckling och undervisningsförmåga.

Mer och "bättre" ämnestoeri i lärarutbildningen framhävs som något som forbattrar blivande lärares yrkesreflektion och undervisningsförmåga. Men, som framgår av undersökningen är dessa ståndpunkter minst sagt tvivelaktiga. För det första, den sortens ämnesteori som betonas i lärarutbildningen gör själva ämnena begreppsligt oförståelig sedda utifrån annat än ett snävt tekniskt perspektiv. För det andra, är det tvivelaktigt om abstrakta ämnesteorier kan förbättra blivande lärares undervisningsförmåga när detta gäller annat än ett ämnesstoff som är nära besläktat med just det abstrakta stoffet.

I rapporten diskuteras detta i förhållande till antagandet att ett nära samband finns mellan den begreppsinlärning som sker i grundskolan och den som sker vid universitetsstudier i ämnena och att detta bidrar till lärarens undervisningsförmåga genom någon sorts "transferprocess" som gör att han/hon kommer att lättare kunna förstå elevens inlärningsvårigheter med ett stoff. Men "transfer of training" (Krathwohl, Bloom och Masia, 1964; Morrison 1989, mm.) sker endast i fall av nära släktskap mellan inlärningstillfällen där det som lärs i ena situation kan tillampas i den andra. Chris och Maureens stoff tycks ha ett nära samband med det som undervisas i grundskolan. Förhållandet mellan andra amnesteori och undervisning i grundskolan, som exemplifieras i kursens behandling av begrepp som "beta-sönderfall" å ena sidan och "årstider" och "relativt läge" å den andra, kan vara rätt vagt däremot. Både dessa på begrepp förekom i undervisning om "jorden" i kursen och förekommer ganska allmänt i undervisning i detta område vid högskolan respektive mellanstadiet.

Transfer påstås inte ske enligt Krathwohl et al. om sambandet mellan inlärningstillfallena är lågt. Detta anses särskilt gälla då transfer skall ske mellan de affektiva och kognitiva domänerna som måste ske om faktaundervisning skall kunna bidra till lärarens yrkesutveckling. Sambandet mellan lärarens faktakunskap och sådana färdigheter som underlattar för barn att lösa problem, som till ex. -egen problemlösning, en undervisningsskicklighet i form av en förmåga att kunna dra slutslatser om hur barn lär och därifrån upprätta en handlingsplan osv., är inte särskilt tydligt i fall av stort begreppsavstånd som den mellan beta-sönderfall och de begrepp som vanligen behandlas i grundskolans mittersta årskurser. Att anta att "fakta-undervisning" av denna sort skall kunna uppnå ett positivt resultat för lärarens undervisningsfärdighet är kanske därmed ogrundat. Abstrakta ämnesteorier och ämnesteori som betonar enbart kunskapens teoretiska dimension blir då av tvivelaktigt värde för lärarutbildningen, särskilt där det gäller de lägre årskurserna. Å andra sidan om lärarutbildare (och lärare) är mer intresserade av auktoritet och kontroll än undervisning är de intressanta frågorna inte vilken sorts kunskap som gör läraren bäst skickad att undervisa utan hur man bäst kan hävda egna intressen trots andras motstånd och oavsett deras uppfattningar och definitioner av de situationer som de befinner sig i (Sharp and Green, 1975).

Fotnot

Alla namn som figurerar i rapporten är falska. Detta är en etnografisk standard som är till för att skydda de inblandade från politiska och professionella represalier i känsliga fall. Standarden har upprätthållits även i detta fall där alla inblandade har visat sig vara arliga och uppriktiga och har placerat sig bortom sådan kritik som kunde göra det fortsatta deltagandet i undervisningen besvärligt för dem, just för att den är en standard och för att den kan komma att behövas någon gång i den fortsatta undersökningen. Trots att analysen i föreliggande rapport fäller ut i en alternativ uppfattning om vad som utgör lärarutbildningskvalité och kan anses vara kritiskt ställd till den verksamhet som refereras, är min avsikt primärt analytisk och inte alls imperialistiskt avsedd. Didaktiskt utvecklingsarbete (kursutveckling, - curriculum development) är mycket komplex, som en till denna dag utebliven allmann didaktisk teori (theory of curriculum) antyder. Förhoppningsvis belyser denna rapport just hur komplext detta arbete är.

Dennis Beach
Mölndal: Feb. 1990.

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"POLICY MAKING":
A Study of Curriculum Development in Contemporary Teacher Education

Introduction

The following report, is the first of a group of reports which examine curriculum development issues in and around science education courses at one university in Sweden, all of which are to be included in a series of reports which look into developments in the teacher education programmes for intending teachers for the Swedish comprehensive school, since the advent of the 1985 Teacher Education Act. This particular report pertains to interview data collected as part of a case study of a common core general science subject studies course on the programme of teacher education offered at one university in Sweden, a university named Baysfield by the author. Other reports in this series include studies of a group of science education students appreciations of their introduction course to their teacher education studies (Beach, 1989) and a study by Wernersson (Wernersson, 1989) of some Gothenburg teacher educators appreciations of the general developments in teacher education since the above named act.

Both the previous reports draw attention to the fact that the changes which are interpreted by participants in teacher education as being implied by the 1985 Act differ, at times quite markedly, as do their understandings of which of the implied changes are (most) beneficial to the professional development of teachers in this country. This report looks closely at this phenomenum through the eyes of participants in one course on one programme of teacher preparation at one university. The selections of course and university were made for specific theoretical reasons. The report attempts to penetrate curriculum development issues and reveal the personal ideologies of curriculum actors connected with curriculum development processes on a general science course.

Two perspectives on teacher educating

Most usually the conflicting ideas about teacher educating which exist between teacher educators are demonstrated as belonging to a clash between the respective "ideologies" of adherants of two former traditions of teacher education; the traditions of class and subject teacher preparation. There is said to be a "collision" of values and interests between the adherants of one or other of these two traditions. These are usually figuratively represented as being formed by competing convictions over the belief that either more or less educational studies (pedagogy), or more or less subject theory, is or should be the pivot of the professional development of teachers. And whilst I dont want to dispute the validity of this dichotomy, it is the feeling of this

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author that it represents only one side of the day to day conflict within teacher education. I base this belief on the findings of the investigation behind this report. I therefore hope, in the following hundered pages, to be able to substantiate this belief for the reader.

The polarisation which I feel is made relevant in this report is one which I believe is more fundamental to teacher education than the afore mentioned dichotomisation across a more or less pedagogy counter subject theory divide. It is rather a dichotomy which concerns the nature of the subject theory and pedagogy studied in teacher education and the purposes to which these are studied, than one which appeals to the relative validity of more or less counterclaimances. The distinction I want to draw is one between teacher education which **prepares** teachers to "do teaching" on the one hand or one which sets out to **make** prospective teachers understand teaching and its effects on the other. In short the dichotomy is concerned with two different perspectives.

1. **A technical perspective** which is concerned with the operation of schools or the preparation of teachers as operatives inside an educational organisation.
2. **A critical perspective** which is concerned with critical thinking skills and a broadened perspective for understanding schools and schooling. **A critical** moral/political perspective.

In a sense the above dichotomy makes the distinction between "more or less" pedagogy/more or less subject theory irrelevant; at least in and of itself. What becomes pertinant in relation to subject theory and pedagogy is their respective natures and their relative complimentarity of purpose.

In the first case, that of a technical orientation, we can see that it is not more or less pedagogy or subject theory which is at issue but **the relevance** of more or less pedagogy or subject theory to the day to day activity of teaching **as it is defined** by the organising authority. In other words the concern is with the teacher **running** the classroom or the administrator **running** the school. Likewise, in the case of critical orientation, what is at issue is not more or less subject theory or pedagogy but the complimentarity of more or less pedagogy or subject theory to the inculcation of knowledge which is intended to "uncover" the secret garden of schooling and schooling processes for prospective teachers. Knowledge such as knowledge about the interrelationships between government, economy, society, subject content, educational institutions and the **functioning** of education generally; within a society and between societies; and which can be coupled to critical analytical skills which seek to integrate this knowledge and apply it to the problems of living in the 20th. (21st.?) century.

Layout

As stated this is one of a number of reports which together intend to present an analysis of curriculum development issues contected to teacher education in Sweden in the wake of the 1985 Teacher Education Act. This particular report is meant to be primarily descriptive although some preliminary analyses of different accounts of the unfolding of events in connection to the course in focus are attempted. Later reports in this series reverse the relative volume of description and analysis and are intended to be primarily analytical. It is hoped that keeping description and analysis appart in this way will permit a greater conceptual clarity in the long run, by avoiding a descriptive base which is clogged by too many different types of concept.

The report consists of a number of sections and subsections which are separated by what it is hoped are suitable headings and subheadings. As well as this introduction, the report contains a short background description, a section comprising part of the database for the investigation on which the report is based, a discussion section and summaries in English and Swedish. The data presentation contains summaries of reconstructions of both teacher educator and student accounts of their appreciations of the different components of the course (respodent validated texts). The different teacher educators interviewed each had responsibility for different parts of the course. The report hopefully shows how each of these parts gained its character through a complicated interplay of social forces, taken for granteds and material power distributions, operating on and through the personal and professional ideologies of the responsible educator(s) and their students. Different students responded quite differently to each of these components, as the data which is later presented hopefully shows.

In brief

Although primarily descriptive the report does attempt to pose questions to the developing text and thereby construct a decscriptive type of analysis. In a sense this kind of analysis is analogous to grounded theorising (Glaser and Strauss, 1967). The idea is the development and testing of substantive theory. A number of such theories are advanced in the body of the report.

The first of these substantive theories, and perhaps the most important one, is that curriculum developers approach curriculum development as a means to enable them to give meaning to teacher education and to allow them to participate meaningfully in it. That is, different curriculum developers have different (pre)convictions about teacher educating and in their curriculum development work they try to "make policy" fit these definitions of reality. They "load" policy documents with personal meanings, interpretations and values which (are intended to) enable

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curriculum development to proceed in ways concommitant to their beliefs as to how it should proceed.

The notion of curriculum development which is given rise to here, amounts to a direct refutation of traditional top-down implimentational models for curriculum development processes. It accredits teacher educators and students an active part in policy making processes and renders problematic within a (partially) decentralised organisation the administrative bodies (the local bureaucracy) way of functioning within that organisation.

A second theory is that although there are some quite powerfull differences between them, each of the professional ideologies identified in this investigation rests ultimately on a taken for granted assumption of the "quality" of the kind of democracy espoused by capitalist social democracy and advanced in the Swedish schools national curriculum. In other words they represent a "normative" orietation toward the relationship between society and education as this is expressed in that document and therefore serve to undergird a technical "non-problematising" perspective for professional development. Professional reflection is in short restricted to technical reflection. This is having far reaching consequences on the development of extended professionalism among prospective teachers.

Another theory is that student biographies are more significant for curriculum development processes than administration at Baysfield has accounted for. Students have certain expectations of science education. Expectations which at times work against the inculcation of "new" values. Students were "unprepared" for a "professional subject studies course", which intended to "advance the notion of professional role laid during the introduction course from a science education perspective" (course syllabus) and parts of the course floundered because of this.

Curriculum administrators have opperated on the assumption that the foundations for the professional role, as they see this to be, exist within a student group by virtue of their completing a course of instruction. In this case this assumption was erroneous. Students had not become fully atuned to the view of teacher role intended by the introductory unit. Some attempts to advance such a role in this course met with heavy resistance from parts of a student group who defined the ultimate purpose of science teaching in presentational or transmissionist terms. In short, the "administrative convenience" (Hargreaves, 1986) of preparing a programme of education from an administrative template (styckmonster) downwards is exposed.

All names which appear in the report, including that of the university itself, are pseudonyms. This is standard ethnographic proceedure which has a primary purpose to protect the individuals concerned from any possible professional reprisals or repercussions and or political manipulation by maintaining their anonymity wherever this is possible.

However there is a secondary purpose which is in a sense more didactic and that is to emphasise to the reader that the names of people and places is of seconary importance to the issues which are raised. Thirdly, the security of some kind of anonimity may also serve to give confidence to the researched in the release of what might for him or her be sensitive information. In this particular case all participants have presented themselves in interviews as good and honest, sound and professionaly capable and creative people, who have coped extremely well under very pressing circumstances. Although the analysis I present in the body of the report may be seen as a critical one which advances an alternative version of what could or should be considered subject studies for teacher education, my intentions are not imperialistic and the report is, as stated earlier, meant to be primarily descriptive. Curriculum development is a very complex and demanding activity as the to this date absence of anything near an acceptable curriculum theory would indicate. Hopefully this report will help those not already aware of this complexity to be more appreciative of it.

Some concepts

The report makes a number of references to actor professional perspectives, professional convictions, personal ideologies and professional ideologies. A short note clarifying what is intended by each of these terms is perhaps in order.

The notion of professional ideology employed by the author; which is sometimes also termed practical philosophy of teaching (Goodman, 1984) and micro-methodology (in connections to curriculum development issues discussed in a subsequent report) takes inspiration from Sharp and Greens definition of teaching ideology (Sharpe and Green, 1975).

> "The relatively abstract definition of the teaching task held by participants (and the set of prescriptions for performing it) which is embedded in a broader network of political and social worldviews derived from the socialising experiences which the participant has undergone."

Professional ideology is not to be confused with ideology in the broader sense of the class characteristique of the participants world or political view. The term ideology is used with the precise meaning of "the ruling ideas of a society" (Rose, Levontin and Kamin, 1984). Ideas which express "the naturalness" of an existing social order and thus set out to maintain it. Neither should professional ideology be confused with the terms professional or pedagogical conviction which are also used in the report and which relate to the term professional perspective (Sharp and Green, 1975) and pertain to the ideas shaping the situational behaviour arising out of the contexts which confront participants in their everyday lives as educators and or student teachers.

Two political perspectives

In advancing the afore mentioned theories, the report draws attention firstly to the analytical significance of the technical/moral-political dichotomisation of teacher education, where differences within this programme of education, between the innovations which are managed on it by the different curriculum developers, can be seen to maximise within the former and more or less disappear within the latter. Further, two analytical perspectives within the moral-political dichotomy are shown to be particularly relevant to analysing the data which has been collected.

The suitability of these two moral-political analytical perspectives lies in their closeness to concepts which are central to the enactment of The 1985 Teacher Education Act at Baysfield. This is crucial for ethnographic research. The two perspectives are both highly political but wouldnt needfully give rise to necessarily complimentary nor necessarily oppositional curriculum development concepts in any sense. Rather this depends on how they are interpreted by curriculum developers. This is one reason why any didactic intentions in relation to this issue have been supressed by the author in this report.

The politics of redistribution

The first of these two perspectives derives from the term "reform" itself and has to do with politics of redistribution. A reform has to redistribute wealth and power in society in favour of the oppressed by definition. The general potential of **this reform**, as it is enacted in curriculum development activities around one course at one university, are what is at issue here. What I am concerned with in connection to this issue are the ways in which the teacher education reform act relates in practice to politics of (re)distribution of relative power and ownership relations in society and how it may favour the less well entrenched in the present economic system.

A greener curriculum?

It is often said (for example Gough, 1989) that the current characteristic of western thought is that, to extend Kuhns terminology, it is in a general paradigm crisis. In that where it is at currently can only (and is only) described by reference to what it is in the process of leaving rather than ajoining itself to. In other words there is a conceptual unclarity regarding how to organise our future. The plethora of "future studies" and professorships in future studies is felt by Gough to form a good example of this uncertainty.

Within education this paradigm crisis takes the form of an increased scepcism towards the behaviourist inspired "epistemological" paradigm (Gough, 1989) and toward scientific materialism as the well of curriculum (content) development. The spate of research in recent years of which this report is meant to be an example, might be indicative of an increased attempt to assert an alternative paradigm for education and the development of knowledge about educating. The second analytical perspective of the moral-political dichotomy which has figured in the analyses attempted in this report, derives from developments which relate very precisely to the general issue of paradigmatic instability, and the need to find a more stable developmental platform than that of market politics inspired scientific materialism, but never the less is also very specific to this particular course in its "adoption" of a "big picture perspective" (Van Matre, 1979), as the pivotal point for curriculum development.

The big picture perspective has to do with a "green alternative" solution to the paradigmatic instability of western democracy. It redifines what may legitimately be called "wealth" but perhaps has little to do with uncovering patterns of power and wealth (re)distribution in society. In fact the perspective is in a sense as oppositional to the historical materialist epistemological bases of vulgar marxism as it is capitalisms scientific materialism. This report is concerned with the evidence provided by the data collected on teacher education in this investigation for a paradigm shift from the traditional kind of "mainstream science teacher education" which is encouched in the traditional epistemological paradigm of scientific materialism, to a green alternative.

The educational consequences of green and "reform" politics

Some sources suggest that there are compatabilities between the critical teacher education paradigm of the moral-political alternative and the green alternative of ecopolitical education (Gough, 1989). For instance, both are felt to be part of a "global mind change" (Harman, 1988, in Gough, 1989) where "zones of knowledge" (Esland, 1971) or disciplines are no longer seen in objectivist terms but rather seem only to represent essences of human experience which cant be detached from human subjectivity. Both alternatives therefore directly challenge the grounds and sufficiency of objectivism and represent, albeit in different ways, moves toward "holism" and interdependency.

The holist interdependency tradition calls then, for an education of the senses, "an education of attention" (Gough), where questions of truth and validity are once more considered in terms of true for whom and under what conditions. Both the moral-political and ecopolitical teacher education traditions are likely to call therefore,

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for a critical interrogation and refutation of the foundations of scientific materialism as a precursor to their own establishment. Whether or not curriculum developers respond to this challenge at Baysfield may function as a measure of the "political seriousness" of their innovations. As far as which curriculum knowledge might be regarded as of most worth in these perspectives, Van Matres (1979) "green" pointer is,

> "The minutae of lifes workings are not of the formost importance... our goal is not pulling apart the insides of a frog but understanding the frog inside the pond and the pond inside the water cycle. ...This does not mean that the small picture of life is unimportant, only that such study should be self motivated and should follow the individuals grasp of the big picture. (in Gough, 1989, p.237)

Although the evidence collected in this investigation is too limited to firmly establish if a definite paradigm shift is in process at Baysfield, it is sufficient to examine tendancies in these directions. It is also directly suited to examining actors relationships to alternative paradigmatic stances. In short, what I want to consider is what political issues make an entrance into the teacher education course studied at Baysfield. The research has thus a particular interest in the patterns of political reproduction which are likely to be enabled by factual processes of cultural diffusion (Willis, 1977) within teacher education since the 1985 Teacher Education Reform Act.

Footnote

The author is white, anglo-saxon, working-class and male, the report is undoubtably and unavoidably coloured by this in some way. All attempts have been made to minimise these effects in data collection and to take account of them in data analysis. I apologise to readers of the report who feel I have been unduly biased in my accounting for the issues raised or neglectfull of weightier matters. I invite the reader to comment on and criticise the report and the material on which it is based in any way they wish.

Background

In cases of revolution, upheaval and renewal, the authority of the officers of an institution must be (re)established according to new criteria or through a reassertion of the power relations which were the basis of their prior force. In these cases officers are called upon to render overt the undergirding assumptions upon which they feel their authority is based. A process which opens the ideological bases of daily practice to critical analysis (Goffman, 1959).

To class teacher education in Sweden as "in the midst of a paradigm shift" since the advent of the 1985 Teacher Education Reform Act, would pre-empt the findings of research designed to determine whether or not this is the case, and would be presumptive. However, what one can say is that the conditions which ethno-methodologists like Goffman see as "ideal" for penetrative studies of daily life settings are presumably relevant to teacher education settings at this time, as the act of parliment behind the reform has thrown institutionally rattified practices open to re-evaluation and displacement, and previously established power-balances may therefor be overthrown unless actors can convince the mandatory powers of the pristine validity of the status quo. This investigation is sited in the wake of parlimentary legislation because of this. In short in order to enable the research to penetrate more easily the ideologies and professional ideologies of participants as they are rendered overt in the struggle for control in the reestablishment of teacher education pedagogy.

The 1985 Teacher Education Act

The new programme of teacher education comes about as a result of an Act of Parliment passed in the summer of 1985 which stated that;

> "All teacher education for teachers intending to teach in the compulsory comprehensive school (grundskolan) should be integrated from the present three stadium structure into one common programme of education with two broad and overlapping grade focusses."

In short the organisational framework of teacher education has been changed by a parlimentary legislation which has ammended criteria for establishing educational practice within teacher educating. Vernersson (1989), presented four routes of accomodation for teacher education which are implied by the Teacher Education Act and with which teacher educators and curriculum developers (must) comply if an "authority of office" is to be bestowed upon them. Each of these routes of accomodation have made themselves known in this investigation. These being;

(a) accomodation to the university tradition,
(b) accomodation to the comprehensive school,
(c) accomodation to general society.
(d) accomodation to teacher education as an institution.

Particular attention has been paid in data analysis to considerations of issues which may be connectable the third of these routes. This route is in some ways the most complicated route of accomodation although it is not always the most obvious one. The second and third routes are also felt to be mutually reinforcing in some respects, particularly in relation to the schools national curriculum. This document voices societies (The States) intentions with comprehensive education. Normalisation of teacher education

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to this document is therewith both a normalisation of teacher education to a system of societal attitudes and values and a normalisation to definitions of comprehensive education legitimated by The State (Vernersson, 1989).

The SIA and LUT Commisions

The Teacher Education Reform Act of 1985 has a history and can be traced back, via Government Proposition 1984/85: 122, most imediately to two parlimentary commisions which were established during the 1970's. LUT, The Teacher Education Commision and SIA, a Schools Commision which looked into the internal workings of the school. With respect to teacher education three common features can be found in the deliberations of both of these commisions, each of which figured in some way in the standing orders issued to the commisions by the government. These being (a) the need to break subject boundaries, (b) the need to break the artificiality of a too powerfull grade constellationalism in the comprehensive school and (c) the ideal of integrating education and subject studies in teacher education. These are all echoed in Proposition 84/85: 122 and emphasised by The Governement in their recomendations to The National Board of Universities and Colleges (UHÄ) concerning the education of teachers for the compulsory comprehensive school.

Breaking subject boundaries

Prior to the 1985 Act subject studies for prospective teachers consisted of two kinds of subject theory. Subject theory for prospective subject-teachers, which were principally disciplinary studies organised by subject departments at universities and generally taught by their officers (Arfwedsson, 1988), and class-teacher subject studies which were given at the colleges of education and are said to have departed from the content of the school subject at first hand; ie. indirectly as opposed to directly from the content of the university discipline (op cit.). However, from the enforcement of the 1985 Act onward the subject studies characteristic is a new one which is meant to be common for both that programmes two grade focusses. Subject studies will still comprise some subject theory for teachers (subject studies subject theory) but they will also contain some field studies in schools and some subject specific curriculum theory (Ämnesdidaktik). At Baysfield the latter two components are organised from the education campus on the outskirts of the Baysfield conurbation as opposed to the subject departments on the city sites and are to be "integrated" with subject theory.

"Early grade" (1-7) subject studies

Prospective "early-teachers" subject studies (1) comprise a subjectblock specialisation (MaNO or SvSO) and subject-option (tillval) which together represent roughly half of the total subject studies for this classification (1-7) of student teachers (45p ci 32% of total education). However, early teachers do have other subject studies blocks which they read together (as opposed to in specialisation or option groups). These general subject studies represent some 50 points (ci 36% of total education). In other words some 68% of the total education of prospective early teachers is made up of some kind of subject study.

This represents an increase in the amount of time devoted to subject studies when compared to the previous class-teacher education. However, the difference is less significant when one reduces the said percentage to account for the propensity of teaching studies (field and curriculum st.) incorporated into subject studies since the 1985 Act (app. 20% of subject studies components according to budgetting proposals for the programmes first two academic years). What becomes significant is the concentration on one side of the natural-human/social science curriculum divide. Graduating early teachers will have the equivalent of up to five years post-comprehensive subject specialist education behind them. For teachers intending to teach science that represents up to a four and a half year increase in some cases in formal post-comprehensive science subject study as compared to lower- and middle-grade teachers before the 1985 Act. Looking beyond teacher education alone and into the total post-comprehensive formal educational experiences of student teachers, up to a 1000% increase in other words in the amount of time spent studying a subject (block) specialism. The changes to subject-studies and subject study requirements, for 1-7 teachers, can be summarised as an insignificant increase in the total amount of subject studies but a substancial emphasis on specialisation.

"Late grade" (4-9) subject studies

Prospective late-teachers (4-9) at Baysfield, in the respective specialisation areas general sciences (NO), maths and science (MaNO), a practical and academic subject combination (PeA), Swedish plus two foreign languages (SvSp) or social and civic studies (SO) are to recieve some 20% less teacher education subject theory than previous subject-teachers have. This reduction corresponds to the 20% of subject study time which goes over to field and or curriculum studies. This corresponds roughly speaking to **no more than** a 10% reduction in total post-comprehensive subject specialist studies for late-teachers (4-9) compared with their subject-teacher predecessors when a three year academic education at the upper-secondary school (N linje) is added to their respective teacher education **subject theory** (2).

Late-teachers with a general science speciality are to study some 130 points (according to current expectations) in their subject specialisms, in other words about 72% of their total teacher education programme. In the previous system prospective subject-teachers spent 75% of their total teacher education programme studying subject specialisations but the programme of education itself was a little shorter (4 as opposed to 4½ years).

Potentially then there is almost no reduction in the amount of subject specialist studies (post-comprehensive) studied by prospective late teachers when compared to their subject-teacher predecessors. What is significant is what subjects are studied, where subjects are studied and when. Subject studies are interspersed by educational foundations units within the new teacher education programme and "credits" are also dealt over a wider range of subjects. For instance, the NO (natural science) enrichment, through its physical geography component, actually broadens the perspective of the upper-secondary science specialisation. In short, more subjects are to be studied within teacher education frameworks by prospective late-teachers and subject studies on the new programme will also include some integrated or interdisciplinary studies; like the course at the center of this investigation. However, especially if upper-secondary school studies are taken into account, the actual volume of subject theoretical studies in specialist subjects partaken of by late-teachers is insignificantly reduced on comparison to their "subject-teacher" collegues. The afore mentioned incorporated 20% teaching studies (field studies and subject curriculum theory) easily accounts for all of the "reduction" in higher education subject theory for prospective late teachers.

Breaking constallational boundaries

In addition to eroding boundaries between academic subjects and between subject and educational study components, the programme of teacher education for the compulsory comprehensive school is to set about the task of breaking down, or deemphasising, the constellational (stadium) distinctions within the comprehensive school which were reinforced by former teacher education programmes "grade distinctiveness" according to Proposition 84/85: 122 (p.4). This is a priority which can be traced back to The Teacher Education Commissions (LUT 74) recommendations to Parliment (SOU 1978: 86) and the findings of The SIA Commision (SOU 1974:53 and 58). Comprehensive teacher education (after The 1985 Act) is to have a common frame of reference in the comprehensive school. The previous threetier structure is to be replaced by a common programme of education with two broad and overlapping categories.

The task of seeing to it that the programme of education really is one programme and that categories really do overlap, has primarily been seconded to the universities themselves. At "policy-text level" instructions within The National Plan to curriculum developers encourage them "to propogate integrated studies between students from different subject specialisations and different grade focuses".

At Baysfield particular weight has been given to study across grade distinctions and this has led to the introduction of courses like the one in question here. In this case two categories of student teacher study a common core integrated subject block at the same time. Within one and the same course two traditions of teacher educating (Wernersson, 1989) and several subjects meet.

Questions of responsibility

The two former categories of teacher education, class and subject teacher preparation, have been pulled towards eachother and two new categories (early and late) which are structurally at least much closer to eachother have been created. In the natural science and mathematics (MaNO) combination (4-9) a total of 13 credits; in subject studies; as 10 point blocks of study content or their equivalent; are given in general science (NO), mathematics, physics, biology, inter-disciplinary studies, free (subject) option choice(s) and chemistry. In the natural science combination (NO) one and a half credits in physical geography and a half credit in technology replace credits in maths. Technology is also integrated with other science credits on both NO and MaNO combinations; although what particular percentage of studies is given over to technology is not known at this time (90 03 31) as this isnt specified on course syllabus or in other policy-documents.

The amount of subject theory on each programme (1-7 & 4-9) has remained roughly the same as it was on the programmes these have replaced (class and subject teacher education) but the spread of subjects has been oppositely adjusted such that subject specialisation has been enhanced in the early programme and dehanced in the late. In addition teaching studies have been 'infused into the framework of subject studies and subject theory has been incorporated into some educational foundation units. This raises the question of resposibility. Formerly clearcut decisions as to who should "take care of" different parts of teacher education have been clouded as divisions between academic subjects in teacher education programmes and between subject blocks and blocks of pedagogy have been rubbed out in response to the governments call for a cohesive (sammanhållen) education.

Two categories of teacher educator

Subject theory has been taught on the two previous types of teacher education programme by two quite different categories of teacher educator. The subject theory which has been taught to prospective subject-teachers, for example, has been taught by university educators whose educator backgrounds were for the most part contained within the university itself where they had usually taught, in addition to subject theory for subject teachers, on BSc, BA and or even Masters and Doctoral programmes. Many of these educators were/are also researchers in their respective fields with a research degree of some kind in their respective subject areas.

The other type of subject theorist, those previously teaching subject theory to prospective class-teachers, tended to come from schoolteaching into teacher education. They tended therefore to have a teaching qualification, usually as a subject teacher, and experience of teaching in some part of the compulsory school, usually in the upper grades. Some of these educators had research degrees from the "academic" departments of universities, whilst others, had done or are doing research at the department of educational research at Baysfields Education Campus (BEC) which is connected in some way to discovering how children learn in subject areas. A research degree was not compulsory for this category of educator, nor is it for university educators in general and it was/is far from a rare occurence that the educators working on either of the two grade enrichment categories lack(ed) a research qualification. Both sets of teacher educators, those with affiliation to the university subject tradition and those with a "strong school background", have tended to claim their group as the one which should control subject studies on the new programme.

Both camps have submitted claims to bureaucrats and administrators declaring why they should be given this responsibility and have pointed out what the dire educational consequences for compulsory education in this country will be (usually expressed in terms of falling academic standards) if they dont get it. Even though the claims etc. which are made seem to pull in opposite directions, subject departments talk about the "dilution of subjects in teacher education leading to a fall in the intellectual quality of schooling" whilst the departments of curriculum and instuction (didactics) reference the need to understand teaching and learning processes in subjects as that which is central, both sets of claims actualy channel into the same ultimate aim; maintaining (improving) the quality of the compulsory schools educational product. Both sets of claims have been supported by referencing either some part of the schools national curriculum, or some part of The Board of Universities and Colleges National Plan for Teacher Education or some part of the "yellow document" (an intermediary document guiding early policy work at UHÄ) and or some part of Proposition 1984/85: 122. That is some part of one or other of the major policy documents which were meant to guide curriculum development within teacher education for the comprehensive school and at the moment still do guide some curriculum workers. Some departments have produced prognoses of the long term economic difficulties which might be encountered by them and which would "kick back" at teacher education quality in the long run was the responsibility which they have had for teacher education subject theory in the past to be reduced.

Both sets of claims are undergirded by assumptions about subject studies which are reinforced by the institutional authority of the departments these officers represent and which, at the same time, reinforce that authority. This is an example of a "two step delegation of authority" (Bourdieu and Passeron, 1977) where each university department, by the mere fact of its existing and persisting as an institution, extablishes conditions for misrecognition of the symbolic violence it exerts because the institutional means available to it, as a relatively autonomous institution, enable it to monopolise the legitimate use of symbolic violence (op cit) and are predisposed to serve additionally, **hence under the guise of neutrality**, the groups or classes whose cultural arbitrary it reproduces.

Subject departments both reinforce their claims for responsibility for subject studies by defining these in traditional terms and have their claims reinforced by the fact that subject departments exist as centers of academic excellence in subject areas. In the case of The Department of Curriculum and Instruction (DCI) at BEC it is the notion of **change** embodied in the reform act itself which is focussed. These changes they define as moves towards subject content as it is in school. Moves which seek to establish a "curriculum subject content", a subject theory which is more "appropriate" because it is established in line with the contents of the schools national curriculum and is therefore more "relevant" to compulsory school teacher preparation. A subject theory which is linked to pedagogy. The domain in which their degree of cultural arbitrariness is at a maximum in subject areas when compared to the subject departments at universities, as it was and is just for these reasons that this/these department(s) were founded and persist.

The settlement of subject responsibility at Baysfield

The Baysfield Board of Comprehensive Teacher Education (Linjenämd), as an outcome of decentralisation, initially had responsibility for seconding subject studies to the different departments at the university. However, feelings were intense around this dissemination of responsibility and Linjenämnds first two sets of proposals were opposed by the departments which were to be involved. DCI were the initial opponents. They strongly opposed Linjenämds first settlement proposal in January 1988 which confered "too much responsibility to the subject departments and didnt respect their departments area of competence" (letter to linjenämnd springterm 1988). If effected, the letter went on, the proposal would inflict far reaching economic consequences which would without doubt inflict injury on the quality of the contribution to teacher education which the department would be able to make; both in the short and the long term. This proposal was withdrawn and then revised by Linjenämnd shortly after the gravity of this departments opposition and the grounds upon which it was based became clear.

Linjenämds revised proposal was instead unacceptable to the subject departments and their senior administrative tutors (principals and directors of studies) **bipassed Linjenämnd** (much to that bodies dismay) and submitted a joint letter directly to The University Board which made clear to that body the collected subject departments vehement opposition to the Linjenämnd revised proposal. A proposal which would only result in the long run in the "complete dilution of the subject knowledge base of the comprehensive schools teaching corps". The matter of responsibility for subject studies wasnt finally settled untill The University Board stepped in during the second half of the 1988/89 academic year. Work has progressed up untill that time with a temporary settlement also levied by The University Board.

As memorandums to Linjenämnd outlining the University Boards deliberations at these times pointed out, each decision was made so that work on planning and execution of subject studies for the programme of teacher education could proceed. The University Board was quite explicit on that point. The Board was also at pains to point out that it had operated (on each occaision) according to what it felt to be implied by the various policy documents available and that it didnt envisage to favour one or other side in the conflict by its intervention. Rather "The Board had been at pains to be fair in its deliberations to both sides" (Joyce, a senior admistrator from the university, at a linjenämnd meeting in august 1989).

The way The University Board stepped in to settle the conflict is quite interesting in itself and perhaps provides a prime example of how bureaucrats are prepared to take control of policy decisions in the names of "effectivity and need" in cases where those who are perhaps better qualified than they to make the decision have pointed to some problems, of interpretation or otherwise, in connection to general policy. Policy is in effect remade by bureaucrats in order to fit an administrative ideal (Hargreaves, 1986).

The University Board were attempting to "rock the boat" as little as possible by administering a decision which was only concerned with "allowing work to proceed" and with "maintaining as near as possible unchanged relative distributions of responsibility with regard to subject studies between the different subject departments and between subject departments and other departments such as DCI" (Joyce). However, the decision could only have been classically administrative if it was not ideologically grounded, something which in the words of the UBs own PM it was. The University Board hadnt' ignored the content of policy documents and concentrated on economic factors only. What in fact UB members did do was override the ideological stalemate by imposing a decision which was grounded in their own definition of compulsory school educational ideology on Linjenamnd.

This is interesting micro-politically. Looking in detail at the make-up of the two boards we can see that (a) the make-up and sphere of interest of participants at university board level is different to that of participants in Linjenämd and therefor (b) participants on university boards are effected by their decisions through their vested interests in teacher education in different ways than are Linjenämd representatives. In terms of the above conflict the vested interests of one conflicting part in the dispute (the academic departments at the university) are over-represented on The University Board whilst those of the other (DCI) **are not necessarily directly represented at all.**

The Department of Curriculum and Instruction is one department within a sector of the university, thus they can be represented on the university board by a sector representative who is not a memeber of that actual department. In fact statistically speaking the sector representative representing The DCI at any one meeting of the university board is most likely not to be a member of that department and the liklihood of the department gaining the same level of formal representation at any one meeting on the university board as the subject departments collectively, is statistically low. So, although The Office of the Board of Governors (RA) may have regarded the decision of the university board as impartial in relation to the terms of the dispute it settled, it is quite possible that what is in actual fact reflected in that decision is the vested interests of one involved party rather than the other. However, administration is also well represented at UB level, so the consensual views of the particular cross-section of administrative personel who forced the debate in the last instance may also be reflected in the final decision. A decision which as such would have developed to meet a set of dual demands from administration on the one hand and the academic departments of the university on the other. The two parties who, in the wake of the decision, seemed to be most satisfied by it.

Ideology and (micro-) politics

The above decision is significant to this research in terms of the professional ideologies it enabled to enter curriculum development on the course in question; and also in terms of the ones it shut out. The decision acted as "gatekeeper", restricting and enabling the access of different categories of teacher educator to different teacher education settings. The educators who were "let into" the course through The Boards decision were able to exact some control over the direction it then took. It is in this sense that The University Boards decision is significant for this particular piece of research. Its consequences can be observed in the curriculum issues raised by the participants from the course who have been interviewed.

What becomes partway visible is how bureaucrats promote the vested interests of some members of the teacher education fraternity in their policy decisions and how these vested interests are then weighed up in teaching interactions between teacher educators and students. Participants in educational settings, in this case teacher educators and students, can be seen to make decisions in teaching settings which are based on how they view the situations they are part of (Beynon, 1985) and on what they feel is and is not appropriate teacher education activity. However, they opperate within constraints which are applied by others through definitions which are in a sense handed down to them rather than created by them. Teaching settings dont exist independently of the macro-setting or in isolation from them (Hargreaves, 1985, Sharp and Green, 1975). Who is formally admitted into teacher education settings for example, is controled at levels other than the settings themselves, as is the amount of room for manoeuvering which these people are then given through economic concessions and so on. Macro-factors impinge on micro-settings in significant ways and it would be wrong to ignore this. At the same time it is equally wrong to ignore the active meaning making which goes on in interactions within micro-settings. This report is intended to heed both these aspects.

Research focus and method

Curriculum workers at all levels, from nursery schooling and day care to research students on post-graduate studies and beyond, are faced with the problem of selecting a fraction of the total accumulated experience of a culture for inclusion in a programme of education. In this process of selection certain questions are asked. For instance; how is the content to be selected? What kinds of experience should be provided? And so forth. The programme of education developed then provides an arena for studying how the selections made are met and treated by those whom they most imediately concern, for example the students and teacher educators involved in classroom interactions. In other words the curriculum can be studied as a site of ideological practice (Whitty, 1985) where the mobilisation of a variety of resources and interest groups can be followed within a common area. It is the recounting of these activities by participants which this research concentrates upon.

Research focus: Accounts of curriculum development

The principal focus of this particular piece of research is the process of curriculum development on a general science course at a particular university in Sweden as it is represented in the accounts of developments within that course which are given and validated by some people who have participated in it. In other words it is curriculum development from an actors perspective which is being considered. Accounts of curriculum development processes have been obtained from participants and then partially analysed in the linguistic forms of the actors themselves.

This is usefull to the research in that it suspends the tendancy of researchers to predefine settings and concepts through armchair theorising and brings him/her nearer the way the settings to be described are lived by those who opperate on a day to day basis in them. There is also an opportunity to collect different versions of events and to compare these with eachother thereby increasing the reliability of the database which is developed and allowing the researcher to check evolving insights regarding the settings studied from an array of different actor perspectives (actor triangulation, Ball 1982, Hammersley and Atkinson, 1983). The idea is then to utilise these different observations in order to make seemingly paradoxical behaviour comprehensible (Burgess, 1984) to those within and beyond the settings studied. The methodological perspective is symbolic interactionist.

Curriculum development, from this perspective, moves away from the top down prescription of educational activities which derives from organisational theory; the seemingly dominant curriculum perspective at Bayefield. The term curriculum development, in the symbolic interactionist perspective, is a descriptive term which refers to evolving patterns of activity which can be observed in curriculum interaction and which are intented to help curricula attain their purposes (whatever these may be in the eyes of different curriculum actors) more effectively. As such curriculum development is seen as involving processes of interpretation and negotiation by and between curriculum actors (learners, educators, administrators) and other groups involved in the educative process (parents, unions). It is a process which moves from the interpretation of a Government Proposition to the selection, enactment and evaluation, of the living content of education and the subsequent (re)interpretation of curriculum propositions.

Studying the curriculum in this way brings with it a number of obvious advantages. Firstly, the analysis can avoid the tendancy of macro-analysis to oversimplyfy education and curriculum development processes to accounts of the influence of monolithic causes. The neo-marxist tendancy to reduce education to terms related solely to economic causes is one example of this. These kinds of investigation are not able to explore the articulation between, for example, ideological, administrative, economic and social practice, like those (operating) between classrooms and capital but rather assume one particular type of relationship for them. In this investigation interviews have been used in order to prepare texts for analysing teacher educator and student teachers appreciations of events in and around a common core science unit. A science course for student teachers intending to specialise in the (maths and) sciences in the Swedish comprehensive schools both grade focuses.

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Research method: Interviews

Open ended formal interviews, where respondents were invited to talk freely about their experiences on the course concerned, were carried out both during and after a block of participant observation on a general science course. The purpose of the interview was to arrive at an understanding of the researcheds appreciations of the course, not to confirm the researchers missgivings about what these might be. The openendedness of the investigation was maintained here by the researchers questioning being of the "follow up" type. That is the researcher, if possible, only posed questions to the researched in connection to something which they had introduced into the framework of the discussion.

As well as opening the interview to the researched it was also hoped that this method would contribute toward making the interview pleasing to the researched, to make the interview "a pleasing form of social intercourse" (Webb and Webb, 1932, in Burgess, 1984). There is, according to Zweig (1948, in Burgess, 1984), a methodological gain in freindliness in that one genuinely attempts to understand and sympathise with the person with whom the conversation is held. This is of course integral with my intention to capture the perspectives of involved parties. The reason for both my openess and freindliness was the search for the kinds of rich data normally exluded from straight question and answer sessions and also to do with my belief that by "letting go the reigns" the researched would draw into the interview that which he or she felt to be appropriate.

The researched had been invited to talk about his/her feelings about the course with the researcher and was fully aware that the meeting was arranged to satiate the researchers curiosity in these directions. The purpose of questioning was to enable the researched to clarify what he or she had said and meant as opposed to being aimed at clarifying opinions about the settings in question which the researcher had arrived at by virtue of other interviews or by virtue of the participant observation he had been involved in. Interviews werent tape-recorded but detailed notes were made in the researchers own particular brand of shorthand. All in all six teacher educators and sixteen students (some in small groups) were interviewed.

Restricting researcher questioning in the above way detracts from the tendancy to steer the course of interviews which the researcher, almost unavoidably, normally has. It doesnt abolish the researchers steering the line of the interview, as it is still s/he who has more influence on which of that said by the researched is to be followed up, but it does restrict it. The researcher is aware that his influence on what is recorded is not necessarily diminished by this strategy. However, by relying heavily on respondent feedback the researcher does check and double check the suitability of that which he does record to the proclivity which he feels characterises the researcheds position in relation to that which they themselves have called forth into the discussion. As such he/she continually checks and rechecks his/her assumptions about the researcheds position during the course of the interview.

Tape-recording would be one way of avoiding the problem of what to record, but such records must be transcribed and transcriptions are unwheadly documents which still leave the task of identifying exactly what was most pertinant to the researcheds postion open to the researchers own proclivity. Transcript analysis is not automatically more reliable than on site recording and partial analysis techniques. In this research a new approach to recording and analysing interviews was attempted. This technique has been used in a previous investigation by the author (Beach 1989) and was termed respondent validated text analysis on that occaision. The technique is built upon an established approach to validation for ethnographic research, and is similar to the respondent triangulation strategy implied by Ball (Ball 1982a).

Respodent validated text analysis

After each interview a text was submitted by the researcher to the researched which was meant to summarise for the latter what the former had interpreted to have been the issues thrown up by the discussion and what he had assumed the researcheds "meaning" to be in connection to these issues. The researched were invited to comment on and submit recommendations for alteration to these texts where they felt these to be appropriate or necessary. When agreement had been reached between researcher and researched on the text and its communicated meaning, the text was designated the term respondent validated text. These texts were ploughed back into the research where they have been used both as objects for analysis and as means to inform the organisation of data collection in subsequent phases of the research. These texts are felt to be more usefull to the researcher as data sources for analysis than transcripts, as they go beyond transcripts, and deal with **the meaning** the researcher and researched collectively feel that aspects of the settings in which they have participated **can have** as well as why these things are meaningfull in these ways.

A note on rigour

Both researcher and researched use and need concepts in order to understand the things about them. However, if the researcher uses his/her own concepts for the purpose of analysing and accounting for the activities of others, s/he runs the risk of becoming their victim. One of the problems of qualitative research is to come to terms with this dilemna. In this research, as in research which is couched in symbolic interactionism generally, the problem has been met with the rule that the interpretations and constructions of the researcher have to meet the subjective world models of the researched in the most effective way. The idea of reaching the truth by a maximum of correspondence between facts and concepts has been replaced by the idea of attaining subjective validity by establishing a maximum of correspondence between actors accounts and their scientific description and systematisation (see also Blumer, 1969 and Hammersley, 1989 and 1989a). In this research open interviewing, follow up questioning and respondent validated text analysis were all employed by the researcher in order to uncover participant understandings of the course in question. Slices of data, different sorts of data and data with emergent theory were all compared with an eye toward the falsification of emergent researcher accounts.

A process of theoretical elaboration is in force which is arrived at by comparing different versions of events and elaborating researcher versions to fit the empirical diversity of these in the establishment of new theory. What is in play is a methodological form of Popperian falsificationism applied to theory development through grounded theorising (Glaser and Strauss, 1967) and analytic induction (Lindesmith, 1947, in Hammersley, 1989) .

Examples of both student and teacher educator texts are presented in the same report so that any similarities and peculiarities between the two sets of accounts to which the reader might be able to relate better than the author are rendered available to him/her. The reader is invited to comment on the material in any way he or she feels fit. I dont regard my analysis as final and any insights which can compliment the authors version of events are most welcome.

Language and its part in objectifications of everyday life

The research places heavy emphasis on language both as an analytical tool and as a source of communicated meaning. Critics may say too much of an emphasis. However, most classroom interaction takes place through or together with discourse and, whilst I would agree that it is not always in the best interests of the researcher to overemphasise one particular source of data or one particular form of data collection and analysis, as is the case here, the common objectifications of everyday life (the research interest) are primarily maintained in and by language; everyday life is "with and by means of the language shared (by) fellowmen" (Berger and Luckman, 1967). The heavy emphasis on language may in fact be necessary if the research is to accomplish its aims and capture the perspectives of actors within the systematic descriptions of curriculum development which it is seeking to provide. Furthermore language opens up a new world to the research which stretches beyond the here and now of interview settings, transcending them (Berger and Luckman) by bridging across zones within the reality of everyday life and integrating them into a meaningfull whole.

> "Through language I can transcend the gap between my manipulatory zone and that of the other; I can synchronise my biographical time sequence with his; and I can converse with him about individuals and collectives with whom we are not at present in face to face interaction. As a result of these transcendencies language is capable of "making present" a variety of objects that are spatially, temporally and socially absent from the "here and now". *Ipso facto* a vast accumulation of experiences and meanings can become objectified in the "here and now". Put simply, through language an entire world can be actualised at any moment. ...All these presences can be highly meaningfull in the ongoing reality of everyday life." (Berger and Luckman, 1967, p.54)

In the complex settings around teacher education (a common) language becomes a prerequisite to understanding the complete biographies of individuals and events and thereby all socially objectivated and subjectively real meanings therein. The kind of linguistic analysis implied by this research is a necessity rather than an expensive luxury if the research is to come to terms with that which it has set out to accomplish. This is more obvious when the report is considered as one part of a larger investigation.

Research focus: The course

The course at the center of the investigation is a common core science course for all students intending to teach science in the Swedish comprehensive school. The course is entitled "The Physical World" and is thematically intended. In 1988/89 the course was built around the following three themes of (i) "Earth and Universe", (ii) "Energy" and (iii) "Matter". The diciplines of physics and chemistry and the sub-discipline of physical geography contributed most of the content. Biology, in the theme Energy, came in as one half-days study via teaching about photosynthesis.

In other words the course is primarliy a physical science course. It is complimented within teacher preparation by a biological sciences component (The Biological World) which is at present (1989/90) given to students during the second quarter of their second academic year. These two units make up all of the natural science subject studies components on the teacher education programme for "early-teachers" (1-7), whilst they represent only a small proportion of the science subject studies (app. 20-25%) for other students.

This particular course was chosen as an arena for study for specific theoretical reasons. As a common core science unit the course is expected to embrace the common subject study needs of two different classifications of compulsory school teacher. It is to provide both a "complete" preparation for prospective primary teachers (4-7) in the physical sciences in that it "completes" and "compliments" their upper-secondary school studies, as well as a platform for further subject studies for prospective teachers for the "upper grades". In other words the course is to meet two sets of very different criteria. On the one hand it is to attend to higher education needs of "adult" learners. On the other to the subject related professional needs of primary (4-7) teachers and presumably therefore to the subject related learning of primary grade (4-7) children.

The course is particularly interesting also in that it is the first science course developed at Baysfield for students studying for service as comprehensive school teachers and the first subject studies course met by students in their studies. Furthermore the course is an integrated science as opposed to a subject specific unit and involves therefore the cooperation of members of staff from several subject departments at the university as well as staff from two departments at the universitys School of Education campus (BEC). The unit is given to students during the second quarter of their first academic year. It stretches across the duration of this quarter and involves full-time study.

"The Physical World": A breif "pre-historical" analysis

The pre-history of the course (the period between its approval as a "concept" and the approval of a syllabus) shows that whilst agreement has been reached by curriculum developers working within this phase on a course title, on course themes and so forth, and whilst a common syllabus has been "signed", the course has generally been envisaged in different ways by them. On the one hand subject theorists tended to look upon subject theory in the course in traditional terms and see the

> "construction of subject theory blocks as integrated blocks of content developed from the summative perspectives of contributing disciplines. ...Subject theory planning and development is independant from curriculum theory by virtue of its being prior to curriculum theory. ...Curriculum theorists should plan their content so that it is in tune with the subject theory which is given, ..this is still principally a subject theory course." (Geoff Pike, curriculum administrator, interview, spring term 1988)

Geoff shows how subject theorists "loaded" the general science course from subject fragmentory perspectives by defining it as "principally a subject theory course" composed of subject theory content which was "integrated" around a number of common themes. This is to be contrasted with a position where the main purpose of the new course (as a new type of course) is "to break in very decisive ways" (Chris Page) with the existing traditions of subject studies.

> "This course is intending to break with the discipline centered tradition of subject theory on teacher education courses. ..It is a new kind of course which has been devised to meet the particular needs of teachers of science in the compulsory comprehensive school. ..The

> course reflects the needs of the teacher through its relationship to the national school curriculum. ..The course has been developed according to the recomendations for science teaching presented in the school curriculum and reflects that documents orienterings perspective. The course is intended to uplift a holistic perspective based upon the relationship Man-Nature-Society which is emphasised in the schools (national) curriculum. ..It is also meant to be developed on a "common perspective" of reality nearness." (Chris Page; from a discussion of course syllabus proposals at a meeting of the Maths and Sciences Working Party May 1988)

Chrises opinions are reflected in the following statement made during a discussion in May 1988 with Eric Rhodes, Director of Studies for Maths and Science Education on comprehensive teacher education at Baysfield, and Ian Streak, a senior tutor at The DCI who had been involved with syllabus work for the physical world course and was a co-opted member of the afor mentioned working party, the latter said;

> "The physical world course is meant to be a new type of course which it is hoped, or rather intended, will lead to a revitalisation of science teaching in schools. ..There is a recruitment problem in the sciences which is most marked by a bottle-neck at upper secondary level. The science courses at the upper-secondary school simply dont recruit well enough to meet current needs ..and whilst there are certainly a number of reasons for this; most obviously perhaps the nature of the upper-secondary courses themselves; one reason is that pupils become disinterested in science even in the comprehensive school. ...By making science more true to life we hope to make it more appropriate to pupils and we also hope that they will find it more interesting. ...We are trying to compose a course with a "big picture" approach. ..Not in the sense that we intend to confront the structures of political, social and economical significance to science in teaching on the course directly, but rather that we intend to approach science subject studies from a big picture perspective composed from the science disciplines. This is a natural sciences course and not a social sciences one! ...What it is intended that the course should look at is how things in the world "hold together" from a scientific viewpoint, ..it is sometimes called an ecological viewpoint."

The physical world course is meant to be innovative then in several senses and is meant to break with existing traditions of science education and convey a world view which is drawn from the MNS relationship expounded in the schools national curriculum. It is interdisciplinary in character and it is to meet "the common subject study needs in the physical sciences" (course syllabus) for primary (4-7) teachers, as these can be "interpreted from the schools national curriculum" (Chris Page). The course is to "draw on the strings of all the science subjects" (Ian Streak) in order to do this and provide science with a "big picture perspective" as "a natural science course" but not a social science one. The course is also to integrate science and technology.

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> "The technical ignorance of the general public is profound when one considers the enormous technical complexity of the world we live in. ..I find it quite alarming and lay much of the blame on the way school science treats technology teaching in schools. ...You know most pupils leave the comprehensive school technologically ignorant! ...This course hopes to take up the challenge of technology education with two purposes in mind. Firstly there is the question of recruitment. By making pupils "technically interested" we hope to egg their curiosity to the extent that they want to study more and that they select a natural science or technology enrichment at upper-secondary school because of this. ...Technology is difficult to define and has during the course of this century become more and more difficult to separate from science. Science teaching in school normally separates the pupil through his studies from his real life experiences. Science teaching is divorced from life experience so to speak. By activating scientific theories in the light of real technology we hope to be able to link life experiences to science and technology and to show students therefore that this can be done. We also of course give examples of how. ...In a sense we are trying to establish a new precedent for science teaching which will eventually lead to science teaching in the comprehensive school which is more in line with what the school curiculum says about it." (Ian Streak, later in the same discussion)

A further dimension of the innovation then is its intention to break the normally found barrier between instruction in science in schools and real life; between scientific theory and "live technology" (Hoskyns, 1976). Instead of conveying the "facts and theories of science" to students separate from the contexts in which they are applied this course intends to teach about the applications of scientific knowledge in society. However, there may be problems in a "big picture" approach of this kind which deliberately excludes the social and political perspective. Primarily of course in that it grossly distorts the picture of science as a social practice which is communicated (Young, 1976). In the case of this particular course, previous research (eg. Beach, 1989) shows the "body of knowledge" emphasis science education students tend to associate with science and the practice of scientists. Cutting science off from the socio-political contexts in which it is played out might reinforce the objective views of knowledge which underpin the science as a body of knowledge perspective. In any event, how successfull can the big picture perspective be when it is divorced from the political and economic factors which encase the practice of science as a social activity?

> "knowledge is inextricably related to its production by people, in a political context, (and) not only in the school which is dominated by a culture of positivism, which locates knowing in methods, not in persons." (Whitty, 1976, p.56).

How far does a big picture approach "break with tradition" in science education, if it doesnt deliberately include and build upon political, social and economic perspectives? Although the focus on problems in a physical science course which is so composed might change, from, for example, the problem of learning a law (eg. Ohms Law) to learning about its application in society, this still presents scientific knowledge to students as objectively available and something to be "got over" to pupils, and not something which is problematic in a wider sense in and of itself.

Science itself isnt put on trial and therefore scientific knowledge may still be approached in an essentially normative manner! So whilst the dichotomy between subject and pedagogic theory may be being redressed as a consequence of this kind of course construction, the purpose of education is still communicated as transmissionist as the dichotomy between technical and moral-political teacher education remains objectively undisclosed. The "big picture" approach of this course may be innovative, but this innovativeness is not necessarily one which adresses critical reflection in a wider sense. The purpose is to be more effective in instruction rather than critically reflective over the content of instruction and the political nature of the discourse within which that instruction is itself couched.

The teaching staff and an outline of their teaching ideologies

The content of this part of the report is meant to set the scene for the respondent validated text summaries which follow. In a sense this section preempts the data upon which it is based. And whilst this might not be ethical according to the tenets of good reporting it is my opinion that some kind of foundation for the text summary section is needed.

Ten members of staff (excluding lab-assistents) from four different departments taught on the physical world course. This report focusses on six of these. The four tutors who together taught most of the curriculum theory on the course and two subject specialists who had responsibility for content development for one or other of the course themes.

The curriculum theorists had all taught in some part of the school system. Three of them regarded themselves as subject specialists in a school sense and these had taught in the upper-grades of the Swedish comprehensive school and in the upper secondary school. These had all taught subject theory to prospective middle- and lower-grade teachers and subject methods to prospective teachers for the upper-grades on the previous teacher education programmes. In these senses they were particularly representative of curriculum theory tutors in general at Baysfield. The fourth tutor concerned with teaching curriculum theory on the unit was an experienced school educator with a background in the middle grades of the compulsory school. This teacher educator had previously taught classroom methods (stadiametodik) to prospective teachers for the lower and middle grades of the compulsory school. This tutor did not regard himself as a science specialist as such, at least outside of his knowledge associated to the teaching of science in the compulsory schools lower and middle grades.

These four teacher educators, Anne Jarvis, Maureen Odin, Chris Page and Tom Lupton worked often as two separate teams of two. Maureen O and Chris P worked together as one team and taught subject theory in addition to curriculum theory on two of the units three themes. Chris P, in his own words a "school chemist" with a university science degree (chemistry major) and qualified teacher with teaching experience from the upper-secondary school and upper-grades of the compulsory school, had overall responsibility for one of these two themes, the theme entitled Matter. Maureen O, also a former teacher of science in the upper-grades of the compulsory school with a solid chemistry background, taught mainly on the matter subunit. She had worked very closely with Chris P on the schemes of work for this subunit and the two of them described the product as a joint effort, although Chris officially had overall responsibility for it.

Maureen tended to teach an "integrated subject and curriculum theory" on the course. The curriculum theory on the Chris and Maureens component was, in their own words, "integrated with subject content" in that curriculum theory was "highlighted in the treatment of content generally within the content area of the theme itself". The schools approach to chemistry was presented in relation to the content and methods of the matter theme.

Anne J taught some subject theory on the two themes "Earth and Universe" and "Energy", although the majority of this was taught by subject specialists from the university. Anne, a physicist and educationalist with a post-graduate qualification in physics as well as a PhD in education, worked with Bill Giles, an Associate Professor from Baysfields University of Technology, on the development of the scheme of work for the "Earth and Universe" theme. Anne felt herself to have been a candidate for responsibility for this theme and or also the "Energy" component. She got neither for one reason or another. Reasons which might be worth considering in the light of findings from this investigation are that (i) Anne is a woman in a mans dominated subject area, (ii) Annes opinions regarding the professional development of teachers are not fully understood by her collegues, principally those collegues who seconded responsibility for the unit to other parties, (iii) Anne was the victim of micro-political circumstances; DCI had been given overall responsibility for the course and it was felt prudent to "compensate" the university departments and second responsibility for curriculum development in different parts of the course to university departments where possible. (iv) Some other reason or a combination of the above. For example, in the light of the (re)definition of the course which lent away during the latter months of the academic year 1987/88 and the early months of 1988/89, among "scientists" who were active in "defining" the course (particularly syllabus workers); where the course became regularly refered to as "afterall, a subject theory course", perhaps the men obtaining the posts were better qualified for the job. Perhaps Anne was a victim of "fossilised subject teacher education traditions" (AJ) opperating within the system as a whole. In other words she might have been a victim of a particular kind of taken for grantedness about science education. I intend to leave the question as to why Anne Jarvis didnt get responsibility for one of the three themes on the physical world course open. At least for the present.

Anne and Bill taught together on some occaisions on the Energy and Earth and Universe themes. Like Chris and Maureen they tried (at times) to combine the teaching of subject theory and subject curriculum theory within one and the same lecture, seminar or laboratory session; but not in the same way that Chris and Maureen had attempted to do this. Bill would present a subject theorists view of subject matter, like Newtons 1st Law for example, and Anne would set this into a teaching-learning context. Firstly by exemplification of childrens conceptions of scientific phenomina and then by setting the two forms of conception (the scientific and the childs) one against the other as part of a teaching problem; the problem of developing conceptual understanding of scientific phenomina.

Models of childrens conceptual understandings of the physical world (for example gravity) were used to highlight youngsters ways of appreciating their surroundings as well as to show the relationship between young learners current scientific forms of understanding and those of disciplinary science. As well as comparing these two phenominal forms of understanding, childrens most common types of misconception in these same areas were at the same time highlighted. A sequencial characteristic to childrens conceptualisations was also demonstrated and this was compared to the historical development of scientific knowledge in these same areas. In this way the developmental process of conceptual elaboration by children was compared to processes of conceptual elaboration by scientists. On other occaisions Anne and Bill taught pure subject theory and curriculum theory (didaktik) on half class rotations but still taught essentially "the same things in the same ways" (Diane). Bill concentrated on subject theory matter and Anne on childrens learning of scientific concepts.

This cooperative venture, whether within the same classroom or otherwise, was particularly interesting in the sense that Anne and Bill actually set out to "render teacher education content problematic within teacher education settings" (AJ) and not just in consultative curriculum development work. However, the way in which they did this seems actually to have militated for a staus quo conditioning of students and at the same time reinforced their own particular content areas claims on teacher education by millitating against oppositional forms of questioning.

Partly because of the ways students want to learn to teach, Anne and Bill, by problematising teacher education content in terms of subject theoretical content and constructivist learning only, seem to have diverted student teachers attention away from other types of question; irrespective of whether students were going to pose these other questions or not. Examples of other types of question which could be asked, are questions for example which pertain to the social and political forces which are at play in knowledge production processes and their reproduction in science courses on teacher education programmes.

In the light of what students "know" about schooling and education at this time (at this stage of their professional development) Bill and Anne, through their problematisation, only legitimate the kinds of question which relate to **why** the kinds of thing which Bill and Anne know about can be usefull for teachers to know and **how** this kind of knowledge can be made accessible through formal teacher education. As a result the type of questions which were focussed on were essentially apolitical and historically individualistic and concentrated on micro-pedagogic considerations of teaching content. As I hope to effectively argue later, from a professional perspective this kind of problematisation may be conjecturous, as it (re)focusses professional reflectivity onto what may in a sense be professionally peripheral questions rather than central ones; at least if one accepts teaching as a primarily political activity as opposed to an essentially transmissionist one.

Far from blaming Anne and Bill for this dilemna the problem is one arising from the unpreparedness of the student group for a wider problematisation of teaching. Rather than blaming students for this I would like to claim that it is inevitable when upper-secondary pupil biographies meet this kind of instruction on teacher preparation programmes; a dilemna of administrative convenience. Anne and Bill operated in accordance with their notions of what "the continuing professional development of student teachers according to the conceptualisation of teacher role which had been laid in the students introductory foundations course was likely to entail in a science education perspective" (AJ and BG). The problem is that this pespective of teacher role hasnt been laid as yet, as the socialising effects of twelve years of schooling havnt been overcome by the ten week foundation course in educational studies which students have completed; at least not in the sense that the concept of teacher role can be transfered by students between affective and cognitive domains in the manner called for when resetting it in a science education perspective. The notion of teacher role advanced in the foundation unit has but briefly been introduced and certainly hasnt been accepted as valid as yet by all science education students (see also Beach, 1989). Anne and Tom were operating normatively in relation to anticipated progression rather than one for which any empirical evidence has yet become available.

Anne also worked closely with Tom Lupton, particularly on field studies for which they took joint responsibility, but even on curriculum theory (didaktik); particularly the curriculum theory on the energy subtheme. By working closely with both Bill and Tom, Anne is a key informant with interesting insights into the way two tutors with very different teacher educator backgrounds view teaching and approach their respective tasks on the course. Anne, as stated earlier, taught mainly curriculum theory, however, she taught no such content connected to the Matter subtheme organised by Chris Page.

Tom L taught only curriculum theory (didaktik). On only one occaision was Tom L involved with the curriculum theory content on the sub-theme run by Maureen O and Chris P. Tom worked very closely with Anne J on the curriculum theory for (particularly) the Energy subtheme but also on the curriculum theory for the Earth and Universe subtheme. Tom was coordinator for the field studies on the unit and visiting tutor for one of the three schools within which field studies were based.

The two other teacher educators with which this report is primarily concerned are the two subject specialists from the university subject departments who were seconded responsibility for the "Earth and Universe" and "Energy" themes. The first of these, Bill Giles, has already been introduced. The second, Dave Turpin, is a geographer from the department of physical geography. Dave is an experienced university educator who also possesses a teaching qualification and has teaching experience from the comprehensive school. Dave was assisted in his preparations on the theme by Barry Gates, another physical geographer. Barry is a senior research fellow at the department of physical geography and has a research degree. Barry assisted Dave in the development of content for the theme and taught some of the content on the course for both Daves and Bills themes.

Teacher Educator Views of The Course

"Curriculum theorists" views

As mentioned earlier the four of the tutors who shared responsibility for most of the curriculum theory on the unit worked very much in two teams. Anne and Tom tended to work together as a team as did Maureen and Chris. Working together or separately in classrooms with students Tom and Anne on the one hand and particularly Chris and Maureen on the other, would seem to have shown (from student accounts) similar patterns of engagement with students. Interviews with these respective educators revealed that they also shared many convictions about teacher education within the pairs. However, they didnt share the same convictions between pairs. In general, and particularly with respect to curriculum theory and the relationship between curriculum theory and subject theory, in some senses quite the opposite would seem to have been the case.

As a result of this sharing of convictions within pairs, in effect Tom and Anne, for example, made very similar kinds of statements in their respective interviews, as did Maureen and Chris. Chris and Maureen were interviewed on one occaision as a pair (in fact this was the only formal interview in which Chris took part, -although we did speak informally on many occaisions). Each of these two educators validated an account of interviews which was identical with that validated by his/her partner.

Anne and Tom were only interviewed once and these interviews were individual interviews. However, the accounts of the course they gave were very similar nevertheless. As a result of this, and on the basis of student accounts, I shall use a summary of the text validated by Anne as generally representative also for Toms points of view. The summarised respondent validated text for Anne and Tom is marked (RV 1) and that for Chris and Maureen (RV 2). These texts, and summaries of the texts validated by Bill and Dave (RV3 and RV4), are presented on the following pages of this report. They are each preceeded by a short introduction which attempts to summarise the actors position by attempting to capture and represent the values and judgements about teacher education curriculum issues expressed by the curriculum innovators concerned. All texts which were submitted to interviewees for respondent validation were presented within a week after the completion of an open interview. The interview itself was carried out within two weeks after the completion of the physical world course (except for Daves interview which was earlier).

Teaching as an abstract problem: A summary of RV 1

These curriculum developers have wanted to urge students to consider childrens scientific concepts as starting points for science teaching. This is an essentially constructivist point of departure.

> "We tried to encourage students to see pupils conceptualisations as something other than right or wrong and rather more as the ways in which pupils look at their environment, and as the ways in which pupils express ..how they relate to the world. We want students to see these (pupil concepts) as buildning blocks (foundation stones) upon which more refined understandings can be built. ...Concepts, when verbalised, legitimate our thoughts and actions for others, even scientific concepts. Concepts are not ways of expressing absolute truths about the world." (AJ, my emphasis)

However, AJs and TLs intentions have broken against student biography in a way not dissimilar to that indicated for Anne and Bills cooperative venture. Students dont seem to have been able to accept Anne and Toms constructivist message; at least not when presented in their constructivist style of teaching. In the compromised reconstruction in the classroom (laboratory or lecture theater) of childrens conceptual development which ensued, learning itself would seem to have been represented as an individual process which develops out of a simplified two way interaction between pupils and teachers. This detracts from students understanding learning as an interactive meaning making process involving many actors (see, Ball 1984, Beynon 1985, Sharp and Green 1975 and Willis 1977) and is divorced from the complex social nature of classroom learning. At the same time it would seem to neglect the findings of a good deal of learning psychology which point out that children learn in a variey of ways and in many settings, by linking "everyday knowledge" to classroom experiences of learning (see for example Hirst, 1969 and Willis, 1977) and could lead to students developing a rather "self-centered narcissistic understanding of the learning process" (Anyon, 1981).

Both educators are favourable to the changes intended for teacher education generally and see these as "paving the way" for a more professionally conscious teacher preparation. A programme which departs from "the process perspective of teaching rather than the product" (TL).

Broadly speaking the approach to teacher educating which Anne and Tom seem to advocate can be summarised as an approach which seeks to achieve a "balanced emphasis on both the teaching subjects and and the pupil" (TL) and seeks to achieve a balance among the various types of learning outcome (cognitive and affective) in teacher education. In their own words, "content in teacher education is important" (TL) and is needed as a "vehicle to develop principles, understandings and generalisations" (TL & AJ) and to develop "intellectual and other teaching skills" (TL).

This is an approach to teacher education which places emphasis on neither teaching methods nor subjects but intends to depart from notions of "a more analytical approach to teaching" (AJ) where the acumulation of information about the teaching process generally and in relation to specific settings is channeled back into a material clasroom situation in order to inform the selection of an appropriate teaching strategy. In short the innovators are concerned that would be teachers think rationally about teaching and use "both scientific methods and proven experience as value systems guiding professional praxis" (TL, his emphasis). Critical thinking (in a technical sense at least) is encouraged as is "the problem solving approach" (AJ) for both the selection and organisation of content.

Both these innovators were also favourable initially to the general innovation on the physical world course of approaching content development from a "broad 'big picture' perspective" (AJ and TL) down toward a more narrow perspective as opposed to what was traditional; the reverse. This would have meant that the course should be structured around units which "transcended traditional subject lines"

(TL). They dont feel the course lived up to expectations in this respect. They dont feel the broad perspective approach was adopted by those tutors who were given responsibility for developing the different themes on the course. Rather individual teacher educators approached the themes on the course from **subject specific** points of departure. This caused problems they feel, particularly for them as curriculum theorists. In effect a new approach to integrating essentially unchanged content, rather than a new approach built upon a new way of selecting content, was arrived at by curriculum developers they feel.

The physical world unit you see as having suffered at the hands of those administrators and teacher educators who would compromise as opposed to openly debate issues. One way in which this took form was in the administration of responsibility for subthemes by proxy during the first staff meeting for the teaching team involved with the physical world unit. This compromise allowed those teacher educators who gained responsibility for subthemes the freedom to "go their own way" and establish their own particular brand of teacher education content. The tendancy to try to do too much for students has also been a real problem. As well as "overteaching" in some parts of the course too much subject material has been crammed into it from too many different points of departure.

The course has been pulled in different directions as a result of the above and neither tutors nor students have had a chance to step back and take stock of what has been going on. Tutors havnt been able to plan "supportive" studies effectively. With regard to field studies, when anchoring the theory on courses such as this to the practice of education in schools more time needs to be given over to the practical problems involved. Alot of these problems can be dealt with at a national level, union settlements etc. which would leave school and university based tutors free to pay attention to local conditions, temporal variations, relating university and school content and to fulfilling percieved student needs.

The content of the physical world unit in the future ought to be developed more around notions of schools and schooling where the science subjects are both dealt with and organised in similar ways. The content of science courses in schools should take their departure from the school curriculum where the subjects which make up the sciences are integrated and dealt with thematically as was intended on the physical world unit. The general science perspective of the school curriculum is orientational in character. Science is presented in terms of the relationship science, technology and society. This orientation leads us to consider childrens conceptualisations of scientific phenomina. Such considerations should be used as a core around which the physical world unit can be structured in the future. As opposed to, as on this occaision, attempting to construct an aggregate around expressions which are inspired by the academic disciplines. The idea is to develop a cohesive, unit which contributes to both the scientific understanding of students and their professional development.

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> Albeit that the subthemes stated on the course syllabus were inspired by the school curriculum, the headings under which the content of these themes was organised were developed by subject specialists who, with the exception of Chris Page, are experts from the university and who have little working knowledge of the school curriculum itself. Content was then loaded into the course around these subheadings, again, for the most part, by subject experts. This ignores the professional dimension this programme of education is intended to have. The practice of schooling needs to be made problematic in the light of the scientific education children are recieving and idealy might recieve, this should be taken as a point of departure for curriculum development on courses such as this one. Considering science in relation to schools and learning ought to be an important point of departure for a subject studies content designed with the needs of teachers and their professional development in mind. Research projects at Baysfields department of educational research have highlighted some of the problems pupils have with understanding and aquiring scientific concepts and and some of the problems teachers have with developing pupils scientific knowledge. This kind of work could be a starting point for developing science education courses on programmes of teacher education.
>
> One of the things teacher educators associated to these projects argue for is that teaching in the sciences in school subjects should have sufficient in common to allow for integration on courses such as this one around notions of systematic thinking and scientific process -"doing science". As far as the final integration of pieces of content knowledge is concerned (the intended learning outcome on the physical world unit in terms of its subject study subject theory content) it is the students themselves who should be encouraged to do this rather than being told what this should be. The treatment of controversial issues as part of the course (where there are no established answers) may help promote systematic thought and inquiry based learning as it would reduce perhaps the tendancy for students to "elicit right answers from staff" and at the same time prevent staff from giving these. Here there is no "right answer" the systematic approach toward establishing an axiom has to be uplifted. Students might then become more able to apply this kind of systematic thought to even more everyday scientific phenomina and in this way build the kind of broad scientific view of the physical world that the course is aiming for.

Anne and Tom are clearly prepared to negotiate content with students, which along with encouraging students to reflect upon their learning experiences, could be said to be one of their major curriculum ideals. However they do seem to have been surprised by the powerfull opposition their content area was set out for from students and teacher educators alike. As particularly Tom emphasised during his interview he and Anne did have an idea of the kind of content they wanted to work with with students, it wasnt all "pie in the sky speculation" as some students seemed to want to imply. The problem was that student resistanse didnt allow them the freedom to develop this in ways they would have liked. As Anne said during her interview;

"Education always involves compromises of some kind but I do feel that both Tom and I were a little unprepared for quite this amount of resistance from the students. ..Not all of them but some just seemed to be totally negative toward anything we tried to do, in fact some of them were almost aggressive towards us. ..I dont think we were able to reach them in ways we would have liked, ..in ways we envisaged reaching them initially."

Some matters of conjecture between Tom Lupton and Anne Jarvis: As stated earlier this respondent validated text, although it is felt to communicate both Tom Luptons and Anne Jarvis position, has been prepared for validation by Anne and not Tom. Toms text, although very similar in terms of its content did differ from Annes in some respects. I want to sum up, very briefly, what I feel these differences are.

Anne is very much involved in doing research and is attached to a project at the university which carries out subject related pedogogical investigations concerned with children and science, science and society and science in schools. Subject related educational research forms a cornerstone for Anne with regard to curriculum theory disimilar to that held by Tom. The research Anne is engaged in is also constructivist oriented. Anne is perhaps a commited constructivist. Certainly her PhD thesis would imply this.

Anne emphasised the treatment of controversial issues on the course as an interesting type of content for both subject and curriculum theory. In connection to the latter, analytical thinking and the kind of axioms by which knowledge is developed would become more visible she says. Tutors wouldnt be able to concentrate on instruction and the mediation of factual knowledge only to students. Anne seems to promote the idea that teacher education should provide students with opportunities to experience (constructivist) learning (oppurtunities to experiment and structure their own experiences) and approach an understanding of constructivist teaching in this way, but not that it should direct them to any specific answers as such. Anne feels the students should drive their own enquiries on the basis of needs which **they identify**. In short Anne would seem to almost advocate a student as a researcher position whilst Tom sees it as the task of research to identify answers to teaching problems in relation to specific teaching content and he sees the task of teacher education as directing students to these and helping them understand what they are about and what they mean.

Anne would seem to feel that there is an almost unlimited array of permutations for teaching situations and seems also to feel that students, when they become teachers, will need to be able to deal with all of these. Preparing them with right answers for a limited variation of learning engagements prepares them for classroom survival not classroom teaching. "Unless of course teaching is primarily a survival activity" (AJ). So, whilst Tom advocates that tutors "do know more about teaching than students" and that thats why they are tutors and that therefore they do have "some instructional responsibility (didaktiskt ansvar)" (TL), Anne would say that this superiority in relation to educating is not general but rather pertains only to "a limited number of familiar situations" (AJ) and that to opperate didactically in relation to this familiarity is to anchor students to certain "particular types of educational engagement (those the tutor is familiar with)" (AJ). This would not encourage them to develop as teachers but would rather do the reverse as it restricts them at best to particular types of inquiry based teaching; "those promoted by the tutor" (AJ).

Both Tom and Anne are firm believers in inquiry based teaching. Both also beleive that teachers must identify the knowledge held in a pupil group and use their understanding of this when developing teaching programmes. Teaching goes, as such, they feel, out from pupil knowledge and understanding as a result. Both educators feel that there exists certain logical progressions through which a childs understanding of a scientific phenominum moves and further that teaching progressions which promote the formation of higher from lower understandings exist parallel to these. But whilst for Tom, teaching progressions are relatively fixed and of limited contextual dependency, in that they are "primarily content dependent and are thus predicatable, manipulative and can be learned and applied, ..two types of understanding forming two points on one line of development" (TL), Anne believes teaching progressions are extremely contextually dependent and perhaps even unstable in that there is "no evidence for their permanency across different settings as understanding of content is relative to the learner in learning situations as well as the teacher in teaching situations" (AJ).

What Anne seems to be advocating more adamantly than Tom is that student teachers should be encouraged to go beyond the surface understanding of teaching progressions so that they may be able to develop these to fit to each childs needs. This is about going beyond an experience of or encounter with subject content and penetrates into the pupil perspective and attempts to found a more genuine understanding of the relationship children form to content (the content of their understanding). Anne feels that teacher education needs, in some way, to be rethought so that this facility can be given. In the long term this would liberate teacher education from the current school curriculum. A document which Anne feels swseps too readily by this issue, resting as it does, in the section dealing with science subjects at least, on what are "fundamentally adult heuristics" (AJ). Annes message is, I feel, that the time has come to begin to consider content through the eyes of the learner in teacher education rather than merely teaching about the virtues of this approach.

"If students are encouraged to 'dwell upon' and reflect over their own learning, and given the opportunity to do so in teacher education,

> they may (will) be stimulated to take more responsibility for their learning in teacher education and the direction that education takes. ..Thus they ought to become more able to understand constructive teaching and the need to teach constructively." (AJ)

Tom, whilst being as equally convinced as Anne about the propriety of teaching progressions, sees these somewhat differently, ie. as lines cutting through points corresponding to one type of knowledge on a spiraling continuum Teaching, in such case, is about lifting or guiding pupil understanding of subject matter to accepted adult understanding. Tom feels that teaching about these matters could be fitted into existing frameworks for teacher educator/student interaction.

The changes to teacher education that Tom sees as important would seem to be primarily changes in content and the selection of content rather than "classroom" pedagogy. The content of curriculum theory, for example, should be guided by notions of the means by which the consecutive replacement of forms of understanding in pupils, on a progression which culminates in adultlike forms of understanding, can be disclosed to students in teacher education settings. Pupils are presented as "lifted up to adult understandings" by being taught the right things at the right time in the right way. Curriculum theory should tell students why and instruct them as to how selections for subject content in school should be arrived at on the basis of what theories like constructivism can tell us about fitting content to pupil forms of understanding (a Brunerian notion) at different stages of development (a Piagetian). Constructivism is chosen as the epistemological basis for curriculum theory through its being implicated by the schools national curriculum.

For Tom, curriculum theory is the "core content" of professional development and it is quite clear that the kind of curriculum theory he advocates would serve the kind of teacher professionalism implied what by he reveals of his practical philosophy of teacher educating. In this, selections for subject theory on programmes of teacher education should be informed by the understandings held by teacher educators about the ways learners (at different stages of development) relate to subject content. What should be taught in teacher preparation is a subject content which strives to help prospective teachers understand the linear progression of conceptual development within the subject area (a Brunerian notion). Subject theory in this case, follows curriculum theory rather than the reverse and is "intergratable into a professional training course rather than corroborated by the same" (TL). Thus what Tom sees as the core of teacher professionalism thereby leads (all) teacher education curriculum development. Toms teacher education philosophy, put simply, would seem to be that students should be taught to teach "constructively".

Anne Jarvis, on the other hand, would seem to want to extend constructivist curriculum development even to curriculum theory education on teacher education programmes. That is, Anne not only wants students to **learn to teach constructively** (if they can) but she also wants them to do this in "constructivist" settings. Anne treats teacher education as an open ended contextually dependent problem for which there are no universal solutions. This is why Anne doesnt **teach about** constructivism but elects to teach constructively about childrens conceptualisations of phenomina and childrens learning in science. Anne has in such case almost a puritanical relationship to constructivism whilst Tom adopts an essentially utilitiarian one.

Teaching as "modeling": A summary of RV 2

The curriculum developers at the center of this innovation turned to the schools national curriculum (Lgr 80) as a source of inspiration. The curriculum recommends a particular type of content for the comprehensive school. This type of content should also form the basis of curriculum develoment on teacher education subject studies programmes therefore, according to this group of educators. The curriculum also recommends a particular approach to treating content. This is exemplified in their teaching on the programme they claim and in that sense also represents their curriculum theory component.

The type of knowledge exemplified as their content on the course is not a traditional subject content (Anyon, 1981) of the type normally treated in orthodox subject theory. However, the way in which the form of content knowledge itself was developed by the tutors in classroom interaction with students may have parallels to this tradition in its centricity on the form of knowledge developed itself. The knowledge mediated by these tutors was well recieved by students and seems to have been appreciated by them as of **direct** relevance to them as prospective teachers. Indeed its direct relevance was also stressed by the tutors concerned with its development.

These two educators seem to see teaching in an essentially technical sense but confound this technical orientation by centering upon a content which is potentially radical in both "green" and "block" political perspectives; however incidental this might be. My contention is that although "Green Politics" may have been an intentionally political aspect of these educators innovation, the politics of redistribution aspect was entirely incidental.

To illustrate this, consider that the organising tutors generally lay emphasis on the **professional** possibilities for this type of knowledge rather than its specifically **political** possibilities; which in radical terms would relate it directly to class, race or gender issues, and the progressive emancipation of oppressed classes within society(ies).

My view is that the innovation is probably primarily concerned with teaching as an insular rather than cosmopolitan activity. For instance the innovators dont question or in any way encourage problematisation of the assumptions underlying Lgr 80, and may encourage students therefore to accept a passive socialisation into a societally normative and professionally insular teaching role.

The innovators are concerned on the other hand with helping students to develop an environmental consciousness which is even politically considerate. The potentially conjecturous treatment of the "permanancy of matter" by the chemists had a distinctly political purpose to make a contribution towards "wresting control of school content from those who continued to condone the sabotage of our continued existence on the planet for private gain by not drawing attention to this more fully" (CP). The pedagogical organisation of teaching content to convey the **permanancy** of matter, although at loggerheads perhaps with energy/matter relationship at subatomic levels, was **justified**, in that "global ecological conditions are so critical that we are dealing with what has become a matter of survival" (MO).

There are political significances in the content which has been developed by these innovators. And, although a number of their collegues are critical along the lines of the unidirectionality of their instructional teaching strategies, the notions of "democracy" and meeting the needs of the "individual", at least as these are developed by educationalists who follow in the traditions of Dewey (see Dewey, 1916, in Dewey, 1966), are primarilly liberalist notions and products of American bourgeois society. As such, to criticise this innovation because it doesnt fulfill professional criteria which are born upon these liberalist notions, may be unfounded if the innovation has primarily "green political" or "marxist" intentions. However, as the innovators themselves draw attention to the role Lgr 80, a document steeped in liberal humanism, has played in their curriculum development work, the "neglect" of providing students with the kind of "democratic (learning) freedom" espoused in that document is unusual.

> The physical world unit was generated in order to break the university subject department monopoly on subject studies and to allow teacher educators to develop a subject studies course in the sciences which departed from the specific needs of school science teachers at first hand (needs which can be identified from the content of the schools national curriculum). The unit was a unit which was originally intended to depart from the school curriculum. It was to be an integrated science unit not a unit developed from individual academic diciplines.
>
> The way the school curriculum treats the sciences provides all the integration needed on a course such as this one. It presents science as the systematic study of our natural (physical and biological) environment and focuses on mans dependancy on a balance of nature. The systematic study of everyday phenomina is the way you see the demands

of the school curriculum as being fulfilled, both within the school itself and with regard to teacher education courses which, like this one, are to depart from the school curriculum.

Subject integration in the sciences is another thing altogether. The school curriculum talks about an integrated science perspective not the integration of the science subjects. The latter may be possible within teacher education at a later date when a broader range of competence within the different disciplines may be a reality for teacher educators as a result of them working together on units such as this one. To be able to see the points of contact one discipline to another is demanding. It cannot be accomplished unless one is really in tune with the disciplines in question. To integrate "a la school curriculum" does not demand this for it is an integrated science perspective that is being talked about there and is about understanding central concepts not integration of the sciences. The school curriculum is implying the examination of everyday life through a lens constructed from the sciences. The object of study is given and the way it is to be examined (subject overarching rather than strictly) interdiciplinary.

If I have understood you correctly you are generally dissatisfied with the way the course as a whole turned out. Whilst you feel your own subsection went satisfactorily the remainder of the course tended to pull in first one direction and then the other. Even curriculum theory, which you had hoped would work as a mortar holding the course together, has pulled the unit in its own particular direction in some cases. As far as your component is concerned you worked with a notion of curriculum theory which you feel is identifiable in the Baysfield prospectus. This was a notion of curriculum theory which students would therefor be able to anticipate and identify. This notion of curriculum theory departs from "how the school treats subject content". This involves exemplification of the "curriculum approach" in the treatment of content on the course.

The other curriculum theorists working on the unit havnt held themselves to this notion however. Rather, the other curriculum theorists have tended to come with their own content and havnt worked with the subject content developed for the unit and used this to exemplify how the school works with subject material. Rather they have developed a content to suit their own particular version of what curriculum theory should be about. Their curriculum theory has thus been divorced from the subject content on the unit whilst yours has been exactly the opposit -structured around this. Their content (the other curriculum theorists) has floated separately from the remainder of the content on the unit.

The other curriculum theorists have also had trouble presenting a picture of what they are trying to achieve with their teaching to students. Even to other curriculum theorists they have trouble explaining exactly what it is they are trying to achieve with their curriculum theory and exactly what the relationship between the idea of education they are trying to develop and the content they are using to exemplify this is. The curriculum theory presented by these teacher educators has been experienced as abstract by students whilst your curriculum theory has had a good point of anchorage in the material presented otherwise on the unit. Your approach to curriculum theory is the logical one. Why else, in a cohesive education, would curriculum theory be delivered as subject specific curriculum theory on subject studies courses if it wasn't to be integrated with the subject content given on those courses.

With the exception of your component, which you feel was cohesive as "a school curriculum inspired subject content", the subject theory on the unit has pulled it in even more different directions than has curriculum theory. Subject theory tended to depart from the academic subject rather than from the integrated science perspective of the school curriculum. The different themes, partly as a result of this and partly due to the way in which responsibility for these was seconded, have developed into "different subjects" and have taken up different aspects of reality and treated them in a subject specific way. The integrated science perspective which was talked about during the preparation of a syllabus for the course has been lost. The subject teacher tradition of former subject teacher education programmes has taken over.

One of the reasons why this may have happened is that the course has lacked concise leadership and one line of development hasnt been established and followed. Fewer persons ought to be involved in next years course and these should be led by one person as opposed to three. The course literature has not contributed to integration on the unit. Using three subject specific course books which depart from different subject perspectives, might, retrospectively, have not been such a good idea. Finding one course-book must be looked upon as of great importance before next years course gets underway.

You are also critical of the expansiveness of one of the course components. The physical geography component, which should have taken up 30% of the total unit, became too large. You both feel that physical geography as a component on a science course is out of place. The sciences consist of (at least according to the national curriculum) physics, chemistry, biology and technology. Geography is a social science subject and physical geography a subdicipline of geography. As such physical geography is not to be encouraged as a component in itself on a science education course. Physical geography can be used to support and illustrate some of the content on the course and this is to be encouraged. Physical geography can also be used to support some content on the biological world unit.

By splitting physical geographys contribution up across two units its tendancy to dominate this one would be reduced as would the tendancy for the biological sciences to dominate in general the science education of early teachers. Integration on the physical world unit and between the physical world and biological world units would be helped by utilising physical geography in this way. In the first case integration would be easier on the physical world unit as only two lots of subject representives would need to cooperate over content selection and planning schemes of work. The third group from this years course, the physical geographers, would be brought in by the other two groups at points where it was felt that they might be able to make a contribution. Using physical geography in this way, also on the biological world unit, would provide a bridge between the two content areas on what should be a common core science component.

Integration on the physical world unit through curriculum theory would also be assisted by breaking off the physical geography component. Physical geography contributed some content to the course which wasnt integratable to the rest of the content given (map projections) and wasnt really to do with the unit as a whole. Physical geography is not a school science subject (not part of the compulsory school science curriculum). Curriculum theorists, from the science department at Baysfields DCI who have experience of teaching science in the compulsory comprehensive school and yet are geographers are not easy to find. It is noticable, you point out, that the geography component was very thin in terms of its curriculum theory content. In addition the two subjects of physics and chemistry are taught in very similar ways in school as part of the general science component on the school curriculum. Curriculum theory could be fruitfully employed as one source of integration on the course as a result of this. This integration could be completed by working around different themes of a physical science character.

Where curriculum development (in contemporary teacher education) is concerned the treatment of everyday phenomina from a scientific perspective should be given priority over more abstract studies. An example given is understanding photosynthesis as the production of biomass and not as a series of chemical equations. In addition curriculum theory should be developed along lines of departure for how the school is intended to treat subject content. Curriculum theory should be, and as you develop it it is and can be, exemplified in concrete terms which relate directly to the subject theory content of the subject studies course concerned thus strengthening the integration. The content of this particular course could reasonably be structured at a level similar to the physics and chemistry of the upper secondary schools science and technology lines of enrichment. Selections from upper-secondary school content could be viewed from the integrated science perspective promoted in the comprehensive schools national curriculum (Lgr 80). Such a course would not be revisionally repetative but would rather provide a testing ground for the application of subject knowledge. This time subject knowledge which had been aquired at the upper-secondary school.

Your block of content was concerned with developing students knowledge in physics and chemistry in relation to understanding the ecological system (this is picked out as a primary purpose in the course syllabus). You are aware that the permanency of matter concept which you sought to develop (to these ends) is conjecturous with the position advanced by the physicists. However, at the level of abstraction at which content is dealt with in the compulsory school this shouldnt be a problem. Even physics subject matter should be orientational in the compulsory school. Sub-atomic energy-matter relationships are dealt with at the upper-secondary school not the compulsory school. If the physicists had held themselves to the notion of curriculum development advanced in the course syllabus the conjecture between your stuff and theirs wouldnt have arisen. The point of emphasis in the permanancy matter concept was "that things dont just go away when you burn them" (CP). In its significance to the Man-Nature-Society theme general to both this course and the previous one, in fact to a continuing theme running through the programme of education as a whole, the conjecture between this content and a small part of the total content developed by the physicists, a part which probably shouldnt be there anyway, is subordinate to the MNS-related "survival" question.

Summary: The school curriculum is central to M and Cs teacher education philosophy. They see this document as speaking of a general (integrated) science perspective not the integration of the science diciplines. The two meanings are not similar according to C and M, integration of the sciences should not become the confused aim of general science courses in teacher education. A reality near general science (orienterings) perspective, on the other hand, must be provided if the science course in question is to reflect the notion of science teaching fostered by the school curriculum. It is from this notion of "curriculum enabled science teaching" that curriculum development on common core general science components should depart.

Although neither Chris nor Maureen placed the content they developed into a politically analytical perspective, nor seemingly encouraged students to do so, the political consequences arising from "mass instruction" in the compulsory school (their ultimate aim?) of the kind of content they have developed and explicitely encouraged students to develop in schools, is potentially very radical. A school content built around "the reality close" dimension of an orienterings perspective could ensue in a content far more accessible to the majority (working class and females) of pupils and a subsequent change in the pattern of (re)distribution of knowledge in wider society. Furthermore, the elevation of "mass consciousness" with respect to (the politics of) ecological survival, as for example via an examination of pollution and the exploitation of natural resources for financial gain (a second dimension to their content) when considered in relation to the currently dominant politics of profit and loss, could in its turn result in an arrestation of current apriori acceptences of what is or is not a manifestation of justice or equality in society or is or is not right or wrong; in other words would be supportive of the kind of "global mind change" pointed out by Harman (Harman, 1988, in Gough, 1989). These educators do seem to have significantly renewed the subject matter content of teacher education subject theory and whilst one could say that they havnt attempted to instill politically critical analytical skills in students, one must conceed that the content they have developed is potentially politically radicalising.

To the disciplines themselves: A summary of RV 3

Both "subject theorists" working on the course would seem to appeal to a traditional body of subject knowledge or discipline as "the well of curriculum development". Both Bill Giles, and as can be seen in RV 4 Dave Turpin, consider

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the subject per-se as (all-)important and use the subject structures of the disciplines themselves as a basis for selecting learning activities; even on this course. However, this is not simply the notion of "subject facts" as all important, as is sometimes supposed. The term discipline actually derives from a belief that the mind can (only) be trained by the most formal kinds of instructional methods. Methods like those used in a discipline centered education. A second assumption which seems then to categorise the accounts of the course given by Bill and Dave would be transfer of training; the assumption that that which is learned in one situation can be transfered or **applied** in another. However, despite these over-riding similarities there are some differences between the approaches to curriculum development which seem to have been availed of by the two educators concerned.

Bill Giles has sought to confer notions of the nature and not just the facts of the discipline upon students and has exemplified the systematic rules employed in the discipline in the establishment of knowledge. Although the focus he develops would seem to be essentially "historically individualistic". (Whitty, 1976 and Young, 1977) and thereby neglectfull of the social and political forces at play in knowledge production processes, the glimse into the "underworld of science" which Bill has tried to give students would be a counter-balance to simplistic inductivist notions which may have been advanced elsewhere. Not the least through the student groups prior upper-secondary experience (see also Beach, 1989).

The type of knowledge Bill seems to be concerned with could be described as conceptual as well as factual. Student accounts would tend to indicate it at times to have been abstract and difficult and "comprised of mystifying understandings which were nevertheless approved of as they were derived from an acceptable source" (Bob, interview).

Bills content was often contrasted by students in interviews to that developed by Anne and Tom. Bills content was consistently regarded as more usefull than Anne and Toms; not the least by 4-9 students. Although there are some doubts as to the worth of "abstract subject theory" (Morrison, 1989) to student teachers professional development, this relationship wasnt really questioned by Bill (or by Dave), perhaps because of their confidence in transferability, or by the vast majority of the student group. In fact knowledge of this kind was **assumed** to contribute to that development.

> "I realise that the content at times might seem a bit abstract and I realise that most of these students wont be likely to be teaching anything like it in the middle grades ..and I am concerned that the stuff should be appropriate to their needs. Nevertheless I still feel it can be usefull to them **even professionally**. By going a bit beyond what they need to specifically know in order to teach I hope to give them access to a greater understanding of that content so that they

> may be able to explain things better to pupils in classrooms. ..Its fairly logical to me that if they understand the stuff better themselves then they'll be more able to explain it correctly to pupils and in ways which they are more likely to understand." (Bill, interivew, my emphasis)

Subject knowledge of the kind presented in instruction by Bill and Dave would seem to have been accepted (with exceptions for the most abstract and most far removed from the possible content of the school) by all involved parties (including curriculum theorists) as an, at least in some way, usefull and necessary commodity in teacher education, even for prospective teachers for the middle grades of the comprehensive school. This kind of material has been accepted by Bill and Dave because of their transmissionist professional ideology which defines teaching quality in terms of the content it mediates and the mental exercise the mastery of this content provides. On the other hand students most probably accept it because of a seemingly generally dominant teaching ideal which has evolved through a kind of "sympathetic introspectionism" (Blumer, in Hammersley, 1989) toward teaching during their upper-secondary school careers. The teaching convictions this has given rise to (see later student text summaries) are powerfully presentistically oriented and very concerned with traditional types of authority and control in the classroom (see Young, 1971). A "better" understanding of the subject matter of education than pupils is seen by students, and by Bill and Dave, as contributing toward classroom control by leaving the teacher "in charge" of educational developments there.

> You came in quite late into work around the development of the course in question and feel that you recieved very little help from your "more experienced" collegues (those who had been involved even in syllabus production) on the course in the articulation of a content area for the first component "Earth and Universe"; the component which you were given responsibility for. You were surprised (despite your subject competence) to be given responsibility for this subunit as you had no experience of designing courses specifically for prospective teachers. You have however taught subject theory to prospective subject-teachers previously.
>
> Feeling a bit "out on a limb" in relation to the task at hand you turned to the physics coursebook for guidance in content selection for your particular part. However, the book lacked coverage of this particular area. Arriving at a workable programme for the (Earth and Universe) component was fraught with small but not insignificant problems. In addition contributing personel seemed contrite to pursue content development "in their own way" as opposed to working as part of a team around a shared notion of what a general science course on a programme of teacher preparation for science teachers for the compulsory school should look like. No such shared notion seemed to exist. Participants seemed, for some reason, to be working against the development of such a notion, albeit perhaps unwittingly, through their preference for the adoption of "personal" approaches (to curriculum development).

One of your worries is that perhaps some of the content you selected as appropriate to the component "Earth and Universe" lacked a perceptable classroom relevance for primary teachers. You expected the staff at The School of Education to be more forthcoming in that respect than they showed themselves to be. When you presented your provisional scheme of work for the subtheme you awaited some kind of critical response indicating what may be usable in the context of this course and what might not and in what ways you might make your original selections more "real" in the light of school issues. However, your collegues on the planning subcommitee werent particularly critical of what had been produced. On the contrary they were very receptive.

I feel you really expected that a very large part of the first draft of your theme would have been "talked out" of the final intention. You say yourself that you feel you finished up having alot of content to fit in and alot of it fairly "traditional" subject theory perhaps. Although you had in the back of your mind the belief that the kind of stuff you were intending to deal with on the component was pertinant to the kind of knowledge about the physical world that science teachers ought to have, the content itself was developed around your notions of the physical world and your notions of the Earth and the Universe at first hand. That notion is fairly typical for the discipline you feel. It was to the discipline which you turned when giving "relief" to your original ideas. You looked to see how the "discipline" (typically) treated such content.

With regard to your "approach" to the treatment of content on the course, although you feel there is a place for alternative approaches to dealing with teacher education content matter, the kind of formal treatment of subject matter content, in a traditional "lecturing" approach, still has a significant part to play, you feel, in imparting the right kind of knowledge to students, even on teacher education programmes. Some of the feedback you have got from students during the course would support you in this you feel (they didnt get this elsewhere and were "thankfull for the subject theorists"). Indeed, as you see it, some of the consequences of more avant garde approaches, such as experimental problem solving perhaps, as it may give a distorted view (simple inductivism) of what scientific inquiry really is about, need to be considered very seriously before the more traditional methods are cast off.

The physical world course was thrown together at haste whilst it progressed. This led to tutors being unable, at the time when the course commenced, to present an introductory lecture to students which presented for them the major intentions tutors had with the course, the parts each theme had in the whole and so on. At the time the first lectures were being presented, the second and third themes were still being planned by the tutors responsible for their development and implementation. A fully comprehensive picture, before the course got underway, of the direction their education was intended by tutors to take, was never presented to the students, but more seriously was not available to tutors either. Despite what might have been said by them.

In some instances the permanancy of matter, a highly controversial issue, was presented as non problematic by one group of tutors in order to reinforce a pedagogical point. Although you are aware of the purpose of this distortion it conflicted with what you had to say about the permanancy of matter as well with what is currently known about the matter energy relationship at subatomic levels. This kind of thing hardly contributes to the promotion of notions of an integrated science component or of team teaching and cooperation across subject boundaries. In addition it is thoroughly misleading to students to present the nature of matter in the way the chemists did when we consider it in relation to what is now known about it. As, fortunately, some students are aware. You are in favour of cooperation in the future between the different departments involved on the unit, but hope that time will be given over to laying the grounds for this cooperation so that the unit may be allowed to develop an identity and a direction of its own rather than be pulled in different directions as has been the case in much of this years exercise. You look forward to the day when the cooperation between subject theorists and teaching theorists and practitioners can develop current educational praxis, as opposed to merely acting toward the teacher education problem in an addendum sense, one providing the subject theory the other applying it to schools or school pupils. You hope constructing versions of teacher education from what is already collectively known can be replaced by cooperative curriculum development which has a genuinely scientific character. Although even the former would be welcomed at this stage perhaps.

In your view subject theory, educational theory and educational practicianship are all important areas (of knowledge) for prospective teachers. With respect to subject theory, if Ive interpreted you correctly, it is perhaps not the volume of factual knowledge that a teacher holds which at first hand determines his ability within the subject. For, although there are, you feel, within all diciplines, some facts which "experts" deem it necessary for participants to know, these are not the only things of importance, (neither) to teachers (nor to subject theorists). Outside of these few facts there is perhaps little factual knowledge which it is absolutely necessary (for the teacher) to know. Rather more important is that the individual has the correct approach to the subject and a scientific attitude.

This is significant from a pedagogical perspective. Pedagogical transformations of a subject content mask its nature on many occaisions. For example, in order to impart knowledge pertaining to the successfull use of Newtons Laws, a teacher need not be familiar with the nature of the questions dealt with at the frontiers of physics and how these relate to the world view of Newtonian physics. However, unless he or she is familiar with these questions he or she cannot be expected to appreciate the restrictions a world view of the Newtonian kind holds. Neither can they therefor be expected to appreciate the consequences which their pedagogical transformation embodies. Problematisation of, for example, Newtons Laws, especially in the light of the seemingly fickle behaviour of some particles noted at the frontiers of physics, is something which teacher educators need to look at very seriously from a whole array of different perspectives. The scientific foundations of content knowledge ought to be made problematic on teacher education programmes, if the science courses offered are to have a truely scientific character.

For future physical world units you would like to see the intensity taken out of the course so that both students and teaching staff have time to reflect over what is actually going on there and organise their collective efforts accordingly. Organising the entire unit under a title such as "The Earth and Universe", one of the three subthemes to the unit, and attempting to integrate into this notions of energy and matter as opposed to setting up these as further subthemes, is a possible point of integration as well as a way to ease intensity you seem to feel.

Summary: To class Bill Giles position as typically subject centered would be to distort what he seems to hold central to good curriculum development in teacher education and teacher education subject studies subject theory. Bills concern is nevertheless discipline centered. Bills primary concern is with the discipline as a means of producing and organising knowledge and with conveying to students a notion of the intellectual means through which knowledge about the physical world is discovered (see eg. Foshay, 1968). Although he approaches the teaching on the course often through direct lecturing about the accepted facts of physics (see student texts for example), his concern is with the discipline as a way of making knowledge at first hand. The facts which Bill sees as important are facts which are necessary to students are they to understand knowledge production within the discipline of physics generally and within those branches of physics which lie closest to the content area "Earth and Universe" in particular. As opposed to presenting the discipline as a collection of facts, Bill seems inclined to want to lay open the logical structure of the discipline. Not just facts of the discipline but the relationships, axioms and laws which guide the production of knowledge in it.

In other words Bill seems set on conveying a "paradigmatic" view of the discipline to students. However, by ignoring social and political dimensions of knowledge production in physics (see also Young, 1971, Hine, 1975) he presents the historical development of science and technology in rational and historically individualistic terms (Whitty, 1976 and Young, 1977). Something which may well be quasi-representative. For as for example Brante (1980 and 1984) and Mahoney (1979) indicate, science; in terms of the set of methods that are used by scientists to investigate the relations among things in the world, and as the canons of evidence that are accepted as giving credibility to the conclusions of the scientist (Rose et al.); is not purely rational. The systematic abstraction by Bill and other scientists, of the proceedures they engage in, **highlight** scientific processes as judiciously rational but the production of scientific knowledge might best be viewed as an interplay of three interrelated systems; the sociological, rational and psychological; (Brante, 1980). And although a dogmatic attitude to physical sciences and the temporary suspension of participation in creating and criticising theories may be an "epistemological necessity" if students are to be initiated into a scientific world view (Jevons 1975), this may be a problem in teacher education in that the status-quo understanding of scientific processes, as essentially absolute and objective, which are currently often held by science education students (see also Beach, 1989) would remain unquestioned. Rather than challenging students assumptions about science, technology and society, and the status of scientific knowledge, as in critical studies, the suspension of criticism would reinforce the already one-sided views of inter-relationships in the production of scientific knowledge which students seem to have developed through their previous school studies.

Subject centricity: A summary of RV 4

Dave Turpin seems to perhaps be more traditionally subject centered than Bill Giles in his relationship to curriculum development processes on this course. This may be due to the particular relationship which Dave, as a physical geographer, sees his discipline, as a geo-science, as having to the physical world content area. However, this strictly disciplinarian interpretation may not have served integration well on the unit. According to student texts Daves content area doesnt seem to have departed so much from the themes laid down in the course syllabus as from some kind of subject specific schema. Although Dave claims to have considered the national curriculum very closely when developing the content for his component the national curriculum orienterings perspective which characterises the content Chris and Maureen describe as theirs isnt evident in Daves referals to his content area. Student texts would indicate that this perspective was absent from the course component and that Dave has departed from the facts of the discipline at first hand.

Whereas Bill Giles worked closely with Anne Jarvis on his component, the curriculum theorist and subject theorist cooperation around Daves theme seems to have been rather less active. Integration between subject and curriculum theory on the theme probably hasnt benefitted from this and indeed the absence of connections to school issues is a regular criticism from students of Daves component and something which Chris Page also drew attention to. There was some active and some passive resistance by students to Daves content area and students in general seem to lack either the inclination or the conceptual apparatus to link Daves stuff to school conditions.

The knowledge which Dave seems to indicate as being developed in conjunction with the unit is a mixture between factual knowledge ordered directly from the discipline and some conceptual knowledge. Not all the knowledge on the component would seem to have been judged by students as of professional relevance to them (ie. usable in school science). Although they were perhaps influenced by Chris Page on this matter. Like both Bill, and Chris and Maureen, Dave didnt call on students to be active in content production. Like these other educators Dave doesnt seem to view interaction processes in the curriculum as significantly contributive to content development, but rather, like these other educators, seems to emphasise content development and mediation as essentially separate issues as in typical transmission pedagogy.

You viewed alot of the work prior to the more concrete activity of loading content into the course as necassary but not always particularly constructive. By this I interpret your meaning to be, that as a result of concurrent for all teachers (coherent) teacher education programmes, a new type of cooperative venture between the different university departments responsible for the education of teachers was called for, and that this took time in which to become established. Previously there had been little or no cooperation between departments. Now they were to work together in both constructing and executing programmes of education for prospective teachers. You dont feel this work as gone forward as well as it might have in all cases. You seem to feel that the representatives of different departments were more interested in promoting, at times, the interests of the department as opposed to the best interests of teacher candidates and teacher education.

Contact with educationalists has helped you to form an understanding for what they are attempting to do, and whilst you dont sympathise with their general points of departure, you have been able to form an appreciation of their intentions. This, you feel is important, although you dont agree with the educationalists convictions about teacher education you have been able to bend your ideas toward theirs and take what you feel were their ideas into consideration when forming your own ideas of what teacher education content selection in your subject area should depart from.

Your viewpoints in general regarding the ideal teacher education curriculum appear to center upon the retention of the traditional (subject-teacher education) curriculum components, together with your own subject which you feel should come in in its own right. The way the national (school) curriculum presents the sciences would support you on this you feel. You emphasise the teachers need for expertise in his/her subject area as opposed to "quacking" in a wide range of subjects. You are very much opposed to subject generalist approaches in the upper grades and in favour of increased subject specialisation for the lower grade ranges. Subject competence is at the center of your conceptions of both good curriculum development and good teaching.

Curriculum theory is something which is new to you and, as far as you can make out, new to the debate (about TEd.) as well. Alot of people are talking about it but noone seems to know what it is. For your own part you feel that the kind of competences the teacher needs in order to develop and renew his teaching are determined by his subject knowledge. Keeping abreast of developments in his subject and having open contact and an exchange of ideas with his collegues. Teaching, aside from this, you see as primarily an intuitive activity.

That is teaching is an intuitive activity once decisions over content are made and providing the teacher has a thorough grasp of the content area. If the teacher knows the content then he has a good chance of being able to teach it without having to rely solely on textbooks.

The idea of subject integration and interdiciplinary studies can be a step forward if it isnt overplayed. You dont want to see integration for its own sake. Although you believe in quality of content and quality education in specialised subject areas you feel teacher educators and then the teachers out in schools, must try to lift up areas within a subject or discipline and between subjects and disciplines where they impinge on eachother. Educators must try to show the interrelatedness of the academic subjects.

The sciences are a human construction. Life is something else. Going outside the pure sciences one can look at the impact of science and technology on society, or the basic physical conditions prerequisit for different forms of human activity, or, the planetary conditions necessary for human survival. These are all important questions which physical geography is concerned with and they are questions which both the introduction course on the programme of teacher education and the physical world unit intended to take up.

Another important point to consider in (teacher) education is the provision of a progression to teaching. A progression which reinforces learning by returning to the same content from different directions and in different contexts. This fits in with the above idea of intergation and (life) sciences but in addition, as one progresses, the degree of complexity and detail can be raised too. Trying to build successively more accurate (more detailed) understandings of the physical environment on previous more naive ones.

When designing your course component you took the school curriculum into consideration. Although the school curriculum, as Chris Page often points out, specifies the sciences in the school as comprising physics, chemistry, biology and technology, the description of how these are to be treated allows physical geography to play a natural and large part. Physical geography, as well as forming a bridge for the sciences over into the social studies block, is also about energy transformations of different kinds which occur in our earth environment. This, you say, is very close to what the school curriculum is talking about in relation to looking at our natural physical and biological environments from a scientific perspective.

Although you are aware that your component received its fair share of criticism from both students and staff for being too intense you dont feel that this was all that justified. The content wasnt all that difficult and was pertinant to the course. Alot of the criticism could be put down to students just not wanting to work. As far as Chris Pages criticisms are concerned, he has made clear what he feels about the school curriculum in relation to physical geography and science education courses. What he cant accept is that he doesnt have a monopoly on interpreting what the curriculum has to say about science. He is crusading for his own type of content. He doesnt seem to be prepared to try and understand what other educators mean by what they say.

A general summary of teacher educator texts

I think it fair to conclude that the summaries of teacher educator texts which have been given in this section show that the educators concerned have differing opinions regarding how teacher education should be organised. Not in the sense that they dont all see the professional development of teachers as paramount to the process of good teacher education, nor that they necessarily have differing views regarding the ultimate purpose of schooling or the role of teacher education, in fact all of them seem in some way to be concerned with a notion of the teacher as a technician running the day to day events of the classroom. Rather, it is what they see as the cornerstones of professional development to these ends that would seem to differ. In other words each group of educators have a different practical conviction of teacher educating. Different understandings of which selections of the total culture of society should be held central to the professional development of teachers are identifiable between the accounts given by them. Each of them seem to prize different elements of teacher culture and seem to want to encourage the transmission of these different elements to subsequent generations of student teachers through a process of cultural reproduction.

Culture and cultural reproduction

Klausen (1983) identifies two distinct ways of defining culture. The first defines culure in orientational terms corresponding to what a dominant class consider as "the most worthwhile activities in society"; a kind of high culture. Of cultural reproduction and the second definition, which he terms the descriptive, he says;

> "Culture, in this sense is the ideas, values, rules and norms which a person takes over from the previous generation and (then) attempts to transmit, often in a somewhat changed form, to the next generation. Culture is, in other words, that which is learned of right and wrong, beautifull and ugly, usefullness and uselessness, about daily activities and the meaning of life." (Klausen, 1983, p.9: my trans)

In terms of Baysfield as an institution and "teacher culture" as the partial culture of professional educators, related in terms to the dominant funtioning of the "teacher education institution Baysfield", the "transmitted" culture of teacher education, in Klausens terms, can be defined as the ideas, rules, values and norms which (previous) generations of teacher (educators) present in formal education as worthy to subsequent generations of teachers and which they then transform to fit changing attitudes and relationships in wider society. However, Klausens definition doesnt account for the active "meaning making" which according to teacher educators versions of the course studied arise **out of interaction** , between, for example, student teachers and their tutors in classroom (lab, lecture theater etc.) settings. According to teacher educators versions of curriculum development, the process of cultural reproduction at Baysfield, takes place **within** the broth of society and not **aside** from it, as part of an interplay of social forces acting on and through complex processes of social interaction **within** a societal infra-structure; the organisational hierachy of teacher education in this country. The vestiges of former cultures of educating are transformed **within** the educational settings provided by the institution, in accordance with the ways the relationships these are seen to form to **new intentions** are understood by the actors involved in the establishment of pedagogy.

The above process undergirds Wernerssons four routes of accomodation (Wernersson, 1989) in that it occurs continuously at different **levels** within the organisational hierachy of teacher education. That is both locally at Baysfield and nationally, "higher up" the hierachy; in government working parties, within union executive commitees, at UHÄ, and so on. That is in settings which relate differently, in terms of the different perspectives of the actors involved, to The 1985 Teacher Education Act. The **irons** of cultural reproduction are warmed first at a pre-institutional level, ie. at a level of society prior to Baysfield as a teacher education institution that is also **responsible** in a sense for its origins and essential fabric as a part of teacher education organisation (principally the national government and its "educational agencies" -UHÄ, Sö and the DES in Sweden). Senior tutors and other curriculum administrators at Baysfield "interpret" the recommendations of central agencies and set up an institutional hierachy, an internal bureaucracy to effect their interpretations (3). The interpretive process is repeated at different levels within this bureaucratic infra-structure (see table 1 below).

Table 1.

Level I	**The State Civic Society Capital**
Level II	Educational Agencies of Level I (Teacher unions, UHÄ, Sö)
Level III	Teacher education institutions (eg. Baysfield)
Level IV	(Baysfields) organisational hierachy University Board Teacher Education Board Working Parties and "Specialisation Boards" etc. Syllabus Groups Teaching Teams Teaching Settings at Level IV School Classrooms

In the sense that not all actors (teacher educators, curriculum administrators and students) transform culture according to the same unitary base (Willis, 1977), the reproduction of cultural attitudes and values is diversifying rather than integrational. Because of this cultural differentiation may be a better descriptive term for the process of cultural reproduction in and through teacher education than cultural reproduction itself is; because of the notions of essential "oneness" and passivity which this term communicates to some readers. The term cultural integration can be used instead of cultural reproduction where some oneness (convergence) is infered. Even in this case passivity is not intended to be communicated. Cultural reproduction in an interactionist perspective, be it differentiation or integration, **is a necessarily acitve** process.

The rest of the report, like the previous section, is concerned in some way, with describing the process of cultural reproduction (differentiation or integration) in teacher education. It attempts to highlight some distinct features of the process in connection to science education at Baysfield. This is begun by a consideration for student appreciations of the physical world science course and its constituent parts. I approach this through a presentation of five respondent validated text summaries prepared from interviews which have been carried out with students. Not only to illustrate the somewhat esoteric idea that the educational ideologies of curriculum developers are significant in curriculum development but also to illustrate the perhaps equally esoteric notion that the student group are a potent force in the process of curriculum development.

Respondant validated interviews: student accounts

Janice and Jane:

> You feel that the major general shortcoming of the course as a whole has been a lack of consistency coupled to a general lack of tempo and direction which has characterised the entire programme of education to date. That is as well as the physical world course the introductory teaching-studies course preceeding it and the maths course you are following now. It would be wrong therefor you feel to just point to the physical worlds shortcomings in this respect. All the units followed to date seem to lack ambition and seem to settle for only a moderate level of performance from students; irregardless of the low failure rate on the general science courses final examination. Although this (failure) could be seen as a symptom of high performance demands, it would be more appropriate to view the low pass rate on this unit as comprising both a poor student performance and a poor examination.
>
> The content delivered on the course has quite often lacked structure. Although you both feel that students should actively form some of the framework into which the subject knowledge they aquire during subject studies is placed, the basic framework must come from the tutors themselves. It should be a reflection of the intentions

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they have with the content they seek to deliver. To every educational experience you see a content to be learned and a purpose behind it. Both content and purpose should be identifiable you feel if the educational experience is to make a positive contribution to your professional development.

You both seem to feel that, especially in the case of curriculum theory, this framework was far too invisible. Students cant be expected to identify the purpose behind what tutors ask them to do without at least some guidance in this task. Some clue as to the perspective from which the content delivered should be viewed (can be viewed) ought to be given. Tutors ought to answer direct questions with more than "perhaps" on at least some occaisions, you seem to indicate.

Far too often curriculum theory sessions subsided into sitting out time. There was a lack of oppurtunity to think through what was presented as students were not given guidance in the identification of what may or may not be considered fruitfull ways of examining the material presented. Curriculum theory ought to be about more than putting together simple circuits. The problem is students were not given necessary guidance in identifying just what this might be. As a result the sessions tended to be "experienced as given" and seemed therefore to lack a purpose behind the activity engaged in. They were subsequently experienced as more or less a waste of time by some students because of this.

What you feel you lacked from curriculum theory was the kind of concrete examples of how to teach different content you recieved during the chemistry methods sessions with the chemistry tutors or the delivery of factual knowledge of the kind delivered during subject components. Curriculum theory was abstract, like subject theory is at times, but without the factual frames of referance which physics and chemistry have. Curriculum theory, like methods seemed to be about how to construct teaching approaches within the sciences. Unlike the case with methods however, the curriculum theorists never took the step beyond the waffel toward describing concrete approaches and concrete solutions to the teaching dilemmas they asked you to consider. In short curriculum theory was waffel (flummig).

The methods components you felt were the highlight of the unit. You felt this because their usefullness to you was readily identifiable. They were connected to the events of the classroom in ways which neither the subject theory nor the curriculum theory components were. They were examples of that which you could take with you from lectures and seminars into the classroom. They were especially relevant to you as 4-9 teachers. As you point out, some approaches must be right, or at least more right than others. All of teaching cant be locked up in guesswork and pure speculation; as the curriculum theorists would have you believe. You need a balance between speculation and fact. Even where there is a great deal of speculation it is more rewarding to examine why one approach may be considered valid, or more valid than another. One cant just speculate on what can be speculated on. You have, you say, a psychological need to feel that you are getting somewhere with your studies otherwise it all feels like just a waste of time. The curriculum theorists dont seem to be aware of that, you feel.

If you could identify what you ought to study yourself at this stage of your professional development you would have little need for a formal teacher education as you could study at home in your spare time. It is a question of balance between two poles you feel; and of making this fit the needs of the student group. Whereas some students may prefer a high proportion of self initiated study others prefer a controled situation. Whereas a student at some time in his/her educational career may be able to initiate his/her own studies they may be unable to do so at others. Whereas a student may be able to initiate his/her studies in one area of study they may be unable to do so in others. Although it may be appropriate to allow students the freedom to initiate their own studies in some parts of the teacher preparation programme it may be unsuitable in some others.

The selection of three specialist books as the compulsory litterature for a general science course left a little to be desired you feel. The books didnt really communicate a common viewpoint on the sciences and tended to pull studies in "subject fragmentary" directions. In addition the selection of three books in a foreign language, especially as two of them were to a fairly high academic standard and availed themseves of a highly technical form of language, was perhaps unduly demanding on the student group. This was particularly problematic when it came to revising for the final examination. In addition a large part of the first block, earth and universe, was not covered in the course books.

The final examination was a real problem. First of all no-one really knew what it was going to be like. Tutors all came with different versions of it. Tutors tried to play it down but then made it harder than anyone reasonably could expect. There was a great deal of confusion around the final examination not the least arising from the confusion about integration on the course itself. Revision for the final examination was a problem which took up most of ones attention during the final two weeks on the course such that all other activities were put into second place. The project work on the chemistry unit, although really tutors shouldnt expect anything else when they spring these kinds of things on students at the last minute, didnt receive any attention at all from the majority of students you have spoken to. Most of the stuff presented had just been copied out of a book.

In general the course tended to jump about a bit from one subject to the next. There was a lack of continuity to studying which was brought about by the unit not holding a consistent line on its treatment of content as either interdiciplinary or subject fragmentary. Rather subject centricity tended to shift according to the tutor concerned and his/her particular whim or fancy of the day. At times tutors could give a really good lecture which looked at some phenomenon or other from the perspectives of several different subjects or from interdisciplinary points of departure. In other cases lectures were held down to very detailed, highly theoretical and abstract studies of very narrow and subject bound aspects of a phenomenon which seemed to be divorced from the other material being dealt with on the course at the time.

In addition to the content being problematic in the above way it was also difficult for students to identify exactly what it was that was expected of them. Partly as a result of the above but partly because of the contrasting approaches to teaching the different types of tutor, subject theorist, curriculum theorist or methods tutor tended to prefer. On occaisions you say the student group met two or three different tutors from two or three different departments in consecutive lessons. Each of them placed different demands on students and set them different kinds of tasks to do. This was compounded by inconsistencies some tutors showed between what they preached and what they practised. Some tutors would claim to decry one type of approach and upplift another in theory but their own classroom practice tended at times toward the reverse.

The student task on the unit was problematic and unclear. Although tutors dont need necessarily to tell students how they should behave as students and although it might be conceivable that a student teacher may benefit from experiencing different approaches to learning you dont feel that tutors should present conflicting models for study approach to the student group in the way they have, nor that these should be disclosed in a confusing manner. Tutors ought to have some idea as to what kind of approach to the treatment of different types of content are most worthwhile and why. It might be worthwhile were they to talk about these with students in some way.

Emma and Barbara

On the whole you both feel the course was constructed around good ideas. Integration in science subjects for example, is a good idea, as thematical studies of the kind indicated in the course syllabus make science more "real life". In addition, keeping subject content on a subject studies unit for primary teachers concrete and closer to the outside world, as was intended on the unit and as was managed on some occaisions, is more appropriate to teachers needs at this level than are detailed abstract subject studies which have their points of departure in the academic discipline itself. The concepts dealt with are more easily communicated to primary children and are more easily understood by them.

Integration is easier when one studies concrete phenomena as opposed to abstracted ones. Each subject specialist can approach each phenomenon from the subjects own points of departure. An integrated science perspective can then be built up by students by combining biology's, physics, physical geography's and chemistry's approaches to each topic studied, both content and methods. This has been difficult on the course as a whole however, as some of the different subject tutors have tended to become too specialised, detailed and abstract in the content they have selected for the course.

The possibilities of "reality near" subject studies for the primary school are enourmous and also much needed. Whilst society needs citizens who are technically proficient, and whilst all citizens are likely to benefit from having a basic grip of fundamental technology, current school science tends to alienate pupils rather than encourage them. By encouraging student teachers to take up the challenge of making science interesting teacher education courses can contribute toward producing generations of school pupils who are enthusiastic toward science and technology, as opposed to the reverse. Your heaviest criticism of the course is perhaps just that it didnt fulfill its potential of showing students how to make science interesting for pupils.

The basic idea of the course of breaking subject studies up into broad categories, earth and universe, energy and matter, and of highlighting selected aspects of these which are considered important, either in themselves or as a means toward illumination of other questions, would perhaps have been a good idea had it been organised better. What happened was that each subject specialist tended to come with short blocks of stuff alot of the time, the relevance of which to the rest of the short bits of stuff being presented was hard to see. If the stuff had been organised around notions of topics,. in the way the content dealing with water was, where each subject specialist made a contribution to a theme which was held together in time and space, the possibilities of seeing, first of all the phenomenon "water", from a more complete science perspective and secondly, the possibility of seeing in action the ways in which each subject perspective and each subjects ways of working can complete and compliment others, would have been possible.

You are critical of the course tutors for not allowing students to actively form these kinds of understandings themselves. Tutors seem duty bound (with the exception of the curriculum theorists who were perhaps guilty of taking matters too far toward the other extreme) to deliver ready made facts which are concerned with needs for further subject study as opposed to challenging students to identify and work around notions of their own needs as prospective teachers in relation to the content area. The course thereby worked in opposition to one of its expressed aims which was to continue the work begun on the introductory course on the student transition from pupil to teacher. The physical world course has not followed up these aims and ideas and is sadly out of line in parts with the previous course in relation to matters of professional development. Even within the course itself you identify a lack of consistency to the professional role. The different curriculum theory and methods tutors have advocated different approaches to organising teaching, different points of departure for the treatment of content, different approaches to the subject and different approaches to pupils. Where these have been clear at all.

Although the course was intended to focus on the primary years of schooling (grades 4-7) you feel that much of the "methods curriculum theory" instruction (the curiculum theory from the chemistry block) had to do with what tutors felt that teachers should do in science in the secondary school. Much of which actually seemed to have to do with what the tutors themselves claim to do in these situations. Tutors demonstrated how teachers should teach certain content at different grades in the school and talked about other concrete alternatives to just that particular treatment. Much of this talk was divorced from any kind of perceived needs you had with regard to teaching in primary schools. Unless of course the intention of the teacher education reform is to take secondary school science into primary school classrooms.

The cooperation between the team of tutors working on the unit has been poor. This has been a big disappointment of psychological significance for the view it escalates of team teaching in general. If teacher educators cant make this work then how feasible is it in the compulsory school for ordinary teachers? Far worse, however, has been that tutors have been far too ready to blame their collegues for this rather than looking to their own contribution at first hand. It is malpractice to decry the activities of collegues behind their backs in the way some tutors have done. Apart from anything else its a bad model and bad for student moral.

One example of the kind of criticism leveled by tutors at eachother was over the course books. Although these were to be criticised it is hardly the place of tutors to publicly ridicule the litterature selected by another department. Even if their own choice of litterature was slightly better in some senses. None of the course books were free from criticism. Why three subject specialist books for an integrated science course? Would it not have been better to select one book which was centered around the topics and themes to be dealt with? Couldnt appropriate stencilled material have been given? These are the sorts of questions you ask about the content and quality and appropriateness of the course books. Selecting litterature in English just because it happens to be in English is ridiculous in your opinions. It may be understandable in the case of the education of technicians and engineers who work in an international atmosphere with English as a common language but is of little help to teachers of science in the Swedish primary school. Primary school teachers have more pertinant questions to deal with than learning English terminology; even though this may be seen as "usefull to know".

All students enroled on the compulsory school teacher preparation programme for science have either three years scientific or four years technical studies at gymnasium under their belts. All of you have a fairly good grasp of science and technology as a theoretical area of study. Far more than is needed for the primary school. What you need is another kind of subject studies rather than deeper theoretical knowledge in the academic subjects themselves. You feel students need a grasp on **how to deal with science in the school** rather than detailed knowledge of, for example, chemical bonding and beta-decomposition. (You dont mean **just** how to mediate different subject matter content but also to what purpose one should develop science content in schools.) Even prospective secondary school science teachers would benefit from this kind of subject studies. The kind of "hands on science" reality near subject studies presented by the chemists on the energy and matter subsections of the course represent the kind of subject studies you are talking about. Thats another one of the reasons why the chemistry block has been more successfull than the others in your opinions.

Primarily though the chemistry block was more successfull on the grounds of the cooperation between the two tutors responsible for it. There was more continuity to the chemistry block as a result. As far as their approach to curriculum theory was concerned you were less happy. Albeit so that the approach had undoubted and clear reference to, and point of anchorage in the teaching of science in the school. These points of reference and anchorage were very much one sided and amounted to tutor versions only. Apart from which (or perhaps as a result) they were also secondary school relevant as opposed to being anchored in some kind of primary school ideology. It is out of line

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with the stated ideals of the programme of education as a whole to treat curriculum theory in this way. ie As an instruction unit which focuses primarily on what teachers do or should do in classrooms but tends to ignore questions of why they should do this or why they do tend to do this.

You emphasise the importance of professional studies (methods and curriculum theory) but feel that these have been treated inconsistently. You have difficulty in separating methods and curriculum theory as distinct elements in professional studies. Tutors havnt made the distinction clear in their teaching. There doesnt seem to be any clear idea of what curriculum theory is as an area of study. In some cases it comes across as a form of subject studies where the emphasis is on learning about something like electric circuits. In other cases it comes across more as what teachers should do when teaching different content. In the event that "curriculum theory labs" (Anne and Toms expt. prob. solving) did have some kind of theoretical commitment or some kind of purpose beyond the subject matter dealt with, these remained undisclosed. The activities students were engaged in during these sessions werent effectively coupled to any particular kind of theory but tended to just follow on from the subject content of the course. At the end of the lab sessions students just replaced any material or equipment they had used and left. The activities they had partaken of werent evaluated in relation to primary education. Although structuring content independantly is important to your professional development there are limitations you feel as to when and how this can become a viable venture.

There are a number of factors which have rendered the course less successfull and less enjoyable than it might have been. Of all of these the final examination was by far the worst. This cast a shadow over the entire course. Firstly the examination was an unprofessionally presented collection of questions which seemed to have been thrown together at the last minute. Secondly little collective thought to that which the examination was attempting to test nor to the group which this was to be carried out on appeared to have been given. Finaly, as a result of the course falling into small parts as it did, the level of detail to which one was expected to study was unclear. (Both students passed the final examination at the first attempt-DB)

Coupled to the question of pass and fail on the unit you raise the question of the purpose of compulsory attendance. Compulsory attendance you can understand in the case of discusion and laboration courses. In the case of a series of lectures where the same material can be read from litterature you are less certain. How necessary was compulsory attendance in this case where most of the questions on the final examination werent from the content treated in lectures and laborations but which had instead been lifted out of the course books. In a more formal sense where is the line for pass and fail drawn in the case of the student who obtains a good pass mark on the paper but who has a poor attendance record and the student with a 100% attendance record but a half points fail on the examination (an actual example). How does this reflect on the teaching on the unit and the relationship between examination result and intentions behind examinations. A range of questions about the relevance of this type of approach to evaluation (ie.final examination type evaluations) for teacher education courses is thrown up by occurences of this type.

Diane

The organisational framework around the teacher education programme is a structure which serves the needs of bureaucrats and administrators as opposed to serving the needs of students. It allows only one way communication, is designed with administrative convenience in mind and is concerned with steering the students rather than educating them. The frustration this causes seeps out over the education in general in so much that any criticism students have is often directed by individual students to individual teachers in classrooms as isolated events and can lead to illfeeling.

This kind of student criticism is not as effective as it ought to be. Students, in the heat of the moment, dont always manage to articulate their critque as well as they might and by being reduced to student outbursts during the course of lectures, student criticisms are often seen as negative by the lecturer concerned. Lecturers, although they too are well aware of the problems of how things work at Baysfield (or rather dont work), then tend to become defensive and close off potential lines of communication regarding the problems which underlie the day to day running of the programme of education. The problem subsides into an "us and them" battle and the initial problem becomes masked behind a stereotyped role play conflict between teacher educators and students. Some students are reluctant you feel, in some cases, to be as forthcoming as they might otherwise be with their points of view as a result of this. No-one enjoys ill-feeling!

You would prefer a group tutor system where disputes and the controversies experienced by individual students could be dealt with as they developed and through which students could obtain better contact with the ideas behind the educational development of which they are a part. Although the present system claims to be open to influence from student quarters and open to students points of view it does little to partake of these effectively.

Very little of the programme of education to date has met with what you feel you need out of it; with the exception of the chemistry on the physical world course. The chemistry part is different from everything else so far in that it is integrated in another way. The teaching staff are both capable in the subject, capable of presenting this in a pedagogically sound manner appropriate to the needs of student teachers and integrating the subject with broader issues; particularly environmental ones. They cooperate well and function as a team. There have been very few occaisions when the work done by either one of them hasnt been complimentary to that done by the other, and there has been little duplication. Most importantly the approach availed of in subject methods is one which enables students to tackle the material presented as students and not as school pupils and the subject theory is presented in ways appropriate to student teachers. It is not that it is of a lower academic standard than "university" subject theory, although you are prepared to conceed that this is also perhaps true at times. It is that it is less abstract and less remote and very relevant to the ideas expressed in the school curriculum.

What hasnt happened on the chemistry component but has elsewhere on the unit, is that students havnt been called upon to deal with content which has come at them one minute from the extremes of the academic discipline and the next from a primary school classroom. In other parts of the unit you have been pulled from highly theoretical and abstract subject theory in one lecture period to primary school content the next. You have been asked to think like children and have been treated like children one minute and like university students the next. This has an unsettling effect on how you manage learning situations as it hides from you what lecturers seem to want you to get out of the course. Further, you find it very difficult, as an adult learner with your own experiences, to think as a child. You question if this is in fact possible.

At times on the course the purpose behind activities (what the lecturer intends to achieve with his/her teaching) hasnt been presented to students and the meaning behind some activities has been difficult to appreciate. In some cases the preparation befor a particular task has been so poor (for example field studies) and the time allotted to students for preparation for it so little, that any real quality of performance on task has been impossible. It has been difficult in such cases to come to terms with what, if anything is being demanded of you as students; difficult to come to an understanding of how tutors view the teacher role. In some other cases what seem to be very well thought out, potentially rewarding activities, have been reduced to low quality performance as a result of diffuse directions as to how much time and effort should be spent on them. Principally no time has been made available for them (if the amount of time hasnt been specified) and so, (if) they are essentially non contributive to final assessments, they are (have been) downgraded by students in favour of alternative, less well thought out and less rewarding but assessed, activities. (The chemistry "project work" in relation to the final examination is what is at issue here.)

Some teaching staff seem to have responded to the need to renew their approach to teacher education whilst others havnt. Much of what has gone on to date (chemistry excepted) doesnt really seem to have been developed with the needs of teachers for specifically the compulsory school in mind. You see alot of the content as being identifiable as staight subject theory and alot of the methods work as very grade specific. ie. As content which belonged to former programmes of teacher education and really should not be a part of a teacher preparation programme for teachers for the compulsory school.

The teacher education programme ought to be developed with the school curriculum and school conditions in mind. Chemistry you say has. Not in so much that the chemistry programme has emulated the content of the school curriculum but rather that it has built a content in line with the aims for science teaching expressed there and has treated questions of teaching methods in a way which has allowed students access to the reasoning which lies behind the intended school approach to science teaching. That is the clarification of key concepts toward the ends of promoting an understanding of science and technology from a the point of departure of its importance to (and impact on) life on earth. Furthermore, as time is at a premium on courses such as this one they must seek to promote active participation and engagement from students such that they may be more likely to propogate their own enquiries later on. The chemistry course was likely to encourage this. The rest of the course components were more likely to do the opposite.

You see the linking of teacher education subject theory to the school subject as very important. Perhaps the most important aspect of a subject studies component on a teacher preparation programme. You see this as something which should be a part of every subject studies component. Giving answers to questions like why a particular approach to science teaching is more appropriate than another and when? What types of content schools might take up and why? And, what kinds of content might be suitable to the different grades of the compulsory school? Is more important for a teacher education programme than giving answers to questions like how nitrogen fixing bacteria utilise available oxygen supplies in order to make chemical transformations energetically viable in both directions. That they do this (if they do) and what the consequences of this are for us in our daily lives has to be the more important criteria for science teaching according to the school curriculum. The chemistry gave these kinds of answer the rest of the course didnt (for the most part).

You find it quite remarkable that a new programme of teacher education avails itself of the same approaches, alot of the same litterature and the same form of assessment as previous programmes did. A general will to change seems to be absent here (at Baysfield) you feel. The programme attempts to steer students into its patterns of engagement as opposed to developing new approaches to meet the student populations own percieved needs. This is of course logically inconsistant with much of the preachings of the course syllabus and of statements made by the course tutors themselves.

Footnote to Dianes text. Diane, like several other students, is commited to the environmental movement. This equips her, and her likeminded collegues, with an opportunity to address content on the course from a politically commited position of Green Politics. A position which I dont have (although in some senses I do sympathise with it) and couldnt use. This may enable Diane and the others of "likemind", to see more clearly than I the (green) political possibilities of Chris and Maureens chemistry and eventually even the (green) political commitment of the curriculum developers themselves. My argument against Chris and Maureens stuff for being "politically soft", in that I dont see it as politically analytical (even though it might be the outcome of a political analysis on their part) and dont feel that it encourages political analysis from students, may be illfounded.

Perhaps I havnt been able to penetrate Chris and Maureens statements about curricula and curriculum development in science as well as I should have with respect just to the green political dimension. For instance, educators who follow a dewian philosophy of education argue powerfully for the individuals own commitment to his/her education. Education shouldnt be completed without "the active participation of the learner"; as it is in transmission pedagogies for example. If Chris and Maureens intentions were political but were also coupled to the dewian type notion of the **necessity** of learner commitment, they may await that the outcome of "political analysing on the part of students" would begin when they, partly as an outcome from their education under Chris and Maureen, felt a need to analyse politically and thus developed a need to develop politically critical analytical skills; something which students like Diane have done. In the mean-time the curriculum developers "priority message" -that all is not well with our world- must come forward as "a matter of ecological survival" and therefore central to syllabus recommendations. They direct instruction therefore at this in ways which are "enabled" by the school curriculum whilst awaiting the development of (green) political maturity in students as a second phase outcome of their education. The point to grasp is that the purpose of the education might be green political from the developer perspective rather than liberal democratic. I dont think this is the case and I feel that most of the evidence would say that it wasnt; but that doesnt mean that it isnt.

Dave and Pete

> The physical world unit was too ambitious in the degree of cooperation it demanded. Too many members of staff from too many different departments embracing too many different ideas and ambitions, apparently also conflicting ones; have been involved. Although you are both in favour of cooperation across subject boundaries and departments in principal, this must work in practice if it is not to be detrimental to the programme of education involved. The cooperation on this unit did not work and the involvment of different departments effectively pulled the course apart. Although the indivdual course components were usually held together well, they didnt hold together at all in total. For example, physical geography, which recieved alot of criticism from your collegues, was well structured internally **as a physical geography component**, as was chemistry. It was between the blocks that the putty was missing.
>
> Some of the content was better than others nevertheless. The content on the physical geography block was good, despite all the criticism they got. The lecturers were skillfull educators and the stuff they presented was interesting and for the most part relevant. The lecturers worked around the course litterature well and gave the kind of clear and concise literature references lacking on other course components. What the physical geography block lacked was a methods aspect. The physical geography components possibilities in the compulsory school were not actualised in the form of concrete teaching examples and ideas. This meant that although the subject content on the physical geography block was very good, the chemistry block, as a teacher education component, was more rewarding by virtue of its connection to the school and school teaching. The only other component on the course which approached the chemistry blocks usefullness in this way was the lower school methods content delivered early on by Angela Jones (who also gave clear examples of what teachers can do in their science teaching in schools).
>
> The weakest content on the course was the **physics** component delivered by Tom Lupton and Anne Jarvis which seemed to be meaningless

and was devoid of relevance to the remainder of the course. Its significance to education in general seemed to align with notions of experimentation and problem solving. The problem was that the problems to be solved were either elementary and easy or totally unclear and therefore impossible. This was compounded by students never being given access to correct answers. The intended learning/teaching activity was never outlined and motivated prior to the lesson and, as the problem solving activities engaged in were seldom summerised at the end of the lesson, this lacked both a beginning and an end. If this was meant to in any way model an approach to teaching appropriate to the primary school you fear the confusion it would impose on the pupil group would be total. You had problems in identifying what the curriculum theorists were aiming at with their teaching.

The physics presented by Bill Giles, although highly theoritical and complex, was more usefull than the experimental physics given by Anne and Tom. There was at least an answer and something worthwhile and challenging to learn. The approach adopted in Anne and Toms physics components also imposed a false role play on students on some occaisions. Anne and Tom seemed to use student conceptualisations of subject matter to illuminate different ways in which school pupils may concieve subject theory. They coupled this to some kind of experimental physics which was meant to show how pupil understandings improve through solving problems. This was only very partially successful you seem to feel.

The first weeks on the course (apart from the first three days) were very intensive. Timetabling was almost 100%, much of which was formal lecturing. This meant that even if students had wanted to follow up lecture content and or had wanted to prepare themselves in some way for lectures, this would have been very taxing. In any event literature references were only fleetingly given.

The combination of heavy timetabling and no literature references was unfortunate as the lecture content on this first part-unit (earth and universe) was extremely interesting and very pertinant to what one can take up in the primary school. The abseense of literature references meant that students werent really able to grasp the content in the best possible way. Firstly, by not being able to read beforehand, students are not able to gain the kind of access to the material presented in ways which would reinforce their learning of that material, secondly, you arent able to reinforce learning by following up and interrogating a lecture with follow up reading either.

The physical world unit is a new course on a new programme of teacher preparation. You feel strongly that students ought to bear this in mind at times. One must expect some "teething troubles" in such situations and one cant expect everything to flow as smoothly as it might do in cases where the same course has been given in the same way over a period of years. You feel many students were unduly critical of the course. It seemed that their primary aim in life was to complain about the educational oppurtunity provided by it. Far worse was the fact that they took the wrong oppurtunity to ventilate this criticism. Albeit true that the course did have real organisational problems, there are times when these problems can be aired and times when it is better to wait. Little constructive can be gained by gnagging and moaning at tutors during lecture time. All this does is upset the member of staff concerned and irritate members of the student population who want to get on with their studies. Your group ventilated problems between eachother at coffee times rather than during lectures and seminares. Airing problems in this way helped you when it came to the final evaluation of the course.

Sandra

Although you enjoyed curriculum theory the general concensus of opinion was that it was a waste of time. (NB. Sandra was one of only three students interviewed who spontaneously used the word "didaktik" -curriculum theory- to denote **any** content area on the course in question). The content which was positively appraised by the majority of the student group was the chemistry content; both subject theory and methods. The reasons for this positve appraisal appear to be this contents assumed usability in schools. The subject content was "reality near" and the curriculum theory was a form of methods instruction, quite unlike the curriculum theory of the previous block. It was concrete as opposed to speculative. The chemistry block was about a subject content which was very relevant to the compulsory school. Its methods showed at a level of treatment of content what can be done in the compulsory school with this type of content.

The contrast between the chemistry and other components on the unit was its direct adaptability to the teaching conditions of the compulsory school. This content seemed to put the needs of the teacher (as tutors perceive these to be) first. Anne Jarvis and Tom Luptons curriculum theory was developed more around notions of developing pupil conceptions in relation to particular types of content whilst the remainder of the subject theory content (Bill Giles physics and the physical geography) seemed to have been developed with notions of further subject study needs in focus at first hand and seemed to have a preparatory purpose for further academic study similar to that of gymnasial content.

With the exception of the approach availed of by the curriculum theorists (Anne Jarvis and Tom Lupton) the unit concentrated for the most part on conveying to students tutor versions of admissible knowledge about the physical world. Content selections were made by tutors "before the event" and the content chosen came from the particular academic discipline the mediating tutor was a member of; except in the case of chemistry where the content was more of an "everyday content" which was viewed from a scientific perspective via experimentation etc. on household chemicals and through considering environmental questions in relation to the permanency of matter. Thus, although the amount of steering on the unit on the part of the tutors has been high, the demands that have been placed on students have been low as students havnt been made to take responsibility for their own education. There is always an inverse relationship between the amount of steering and the demands on students in terms of taking responsibility for their studies. Forcing students to take responsibility for their education should be one of the ultimate aims of any teacher preparation programme which intends, as this one claims to, to produce professional educators who can take responsibility for helping others gain their autonomy as learners. You are firmly behind this aim but dont see most parts of the course as contributing to its realisation.

The curriculum theory attempted by Anne Jarvis and Tom Lupton came closest to meeting the above and was the most interesting content in a way on the whole unit. The student group, however, seemed reluctant to make a commitment to it. You found it difficult yourself you say to adjust to what they (Anne and Tom) appeared to be commited to on all occaisions. Especially when students were asked to adopt a pupil perpective the true nature of the learning involvment became masked behind a false role play participation. The tutors concerned with this content area seemed to hope that students, by adopting a role where they viewed lesson content from a pupil perspective, would be able to strip their own views of it from any preconceptions about it which they held. Apart from overplaying this type of approach to the extent that it became repetative you dont feel that the tutors had reckoned with students missunderstanding the purpose of their educational involvment in the ways in which they appeared to do. Neither do the tutors appear to appreciate how difficult this activity can be. At times it was easy to misinterpret activities in the pupil perpective as "playing with equipment", "playing a role", "being a pupil", and so on. It was easy to feel that one was being treated in a childish fashion and the appreciation for the teaching one formed was tainted as a result of this.

The physical world unit broke against the ideals established in the introductory unit. The developed responsibility for ones education which that unit appeared to be anxious for students to aquire was absent on this science course as was the view of knowledge promoted in the first course. The use of final examinations highlight both of these factors. On the contrary this course seemed more interested in passive student participation and wrested from students any kind of repsonsibility for the direction their education was to take. This wresting of responsibility was not always resisted by students. In fact the general approaches to learning which students seemed to desire perhaps rather encouraged it. Whatever the case may be you have been able to coast through the course on the basis of sound gymnasial competence and good general knowledge.

Summary of student accounts

The text summaries given here are not statistically representative of the distribution of types of student understanding encountered among the students interviewed. On the contrary, Sandras text for example, is an exception, a one off or "deviant case" (eg. Ball, 1982, Hammersley and Atkinsson, 1983, Burgess, 1983) as is Dianes, and furthermore the research endeavour hasnt deliberately set out to categorise in the phenomenographic sense (eg. Marton, 1981, Marton and Wenestam, 1984). The texts are rather meant to show variations in the structure of the understanding of the course (Georgi, 1975) among the students and teacher educators interviewed, and to highlight certain qualitative differences which could account for seeming paradoxes in observations of and generalisations about the settings concerned which have been made.

The student text summary examples given show that the students concerned generally supported Chris and Maureens content and generally rejected Anne and Toms, whilst Dave and Bills components received a "mixed reception". For instance, whilst 4-9 students were quite often enthusiastic about Dave and Bills stuff 1-7 students were more reserved in their appraisals. The opposition 1-7 students most often tended to level at Dave and Bills subject content was grounded in the content delivereds' "lack of direct relevance" to teaching in the middle grades. In short;

> "It tended to be remote to our needs as teachers in the lower grades of the compulsory school. ..It wasnt just in the **professional sense** that it was a bad example of **how to teach** in the lower grades, even Chris and Maureen "lectured us" at times. It is more that the content itself didnt reflect the needs of pupils by being connected to the reality near orienterings perspective of the school curriculum. It was just **typical subject content**. ..It was very abstract at times, especially Bills stuff, and was so remote from the kind of stuff which we are likely to teach about as 1-7 teachers that theres no way we could convert it (omsatta) into useable classroom material." (Jocelyn, 1-7 student, my emphases)

This doesnt mean that 1-7 students have tended to look at their teacher educatation as technical preparation in a more powerfull way than 4-9 students. Even though tutors (subject tutors) may get that impression in the classroom or lecture theater.

> "They (1-7 students) try to restructure everything in terms of how they can use it in classrooms, if they cant do this with a block of content then they start to complain". (Barry)

Rather, the 4-9 students who have been involved in this course have been at least as concerned with technical preparation for teaching as their 1-7 collegues. The difference is that whilst 1-7 teachers have difficulty seeing the relevance to their projections of the teaching task of being able to do or know some things such as how to calculate the speed of an electron, 4-9 students (some of them) can envisage teaching this in the classroom whilst others see it as "surplus as teaching content per se" (Thomas) but usefull in that "it goes beyond what we need to know to teach but in a way that helps us understand that which we do teach better" (Steve).

Bill and Daves components were most often contrasted to those of Anne and Tom. Bill and Daves components were also most often regarded as more suitable (more valuable or usable) than Anne and Toms, even by 1-7 students, despite the above. Sandras text, particularly as Sandra intended to specialise at 4-9 (she has left the course), provides an interesting example of contrasts to this as do parts of Emma and Barabaras text.

The impact of student biography

Student interviews show that all student teachers come to teacher education with a preformed **specific** understanding of what teaching is or should be about. Something which is also clear in the text summaries given here. In short, at the time student teachers sit down to their first teacher education seminar or lecture, they already have an articulated understanding of what teacher education should be about, in that they **already expect** teachers to behave in certain ways in classrooms.

This understanding is theirs, as **they** articulate teaching as an activity to be. It is valid for them whilst they hold it **irrespective** of what tutors, in the event that they are aware of it, may think about it. As student teachers have many years (at least 12) of participatory observational experience of teaching behind them when they come to teacher education, this is perhaps not too surprising. Providing of course that one doesnt associate too much passivity to the pupil role. Student teachers anticipate that teacher education is aimed toward developing the skills and knowledge which nourish their "assumed" ways of teacher behaving or alternatively, that it will come up with an **alternative model** of how to teach to which **they can relate**, and which is then "fed into" in subsequent instruction.

Interviews (and texts) show that students expect good teachers to be commited (decisive and convincing) in their knowledge and their patterns of behaviour (see also Wernersson, 1990 enkät undersökning -forthcoming), although only partly **because of** knowledge and skills they have aquired from a teacher education programme which aims to produce teachers with these particular skills and this particular knowledge.

These expectations are activated in teacher education settings and help to shape the student experience of and therefore also their response to, the courses and course components they attend. Quite simply student teachers respond in positive ways to courses which fit their ideas and to content which they think can be articulated into concrete activity in line with what they feel to be "right" about educating. Student teachers respond negatively to course content which they see as non-educational (in that it doesnt feed into the above described model enrichment/replacement-enrichment paradigm) and "resist" ideas which dont relate to that model. This **active** view of student participation conflicts with some teacher educator experiences.

> "Its like trying to get blood out of a stone trying to get any feedback from students. No matter how open we present ourselves as being to their suggestions we get none. ..Its like beating your head against a wall. We always start by asking them what they think and how they feel we should go about things; .."do you want to work in small groups or pairs, do you want to review literature or discuss problems,

> how do you want to present your work and so on". Its still we who finish up deciding, ..and then we have to listen to a load of griping afterwards besides. ..It can be a bloody thankless task." (John, interview, as part of an earlier investigation)

John seems to have shut off the moderating effects of student responses (or lack of them in his eyes), on the direction the education actually takes, when making this statement. If we look at Johns statement in the light of what students might actually want, we see that they are **forcing him** to present what he feels is appropriate. In an active sense they are **denying** John access to their understanding of what teaching is or should be about and **forcing** him to divulge his (or that of the pedagogic authorty he represents). Although students dont actually verbalise this ideal for him, it doesnt mean that they are not **actively** behind its eventual articulation as part of classroom engagement. As he says himself they certainly verbalise their critique afterwards. Furthermore, to expect students to verbalise their views at the start of a series of lectures or seminars may be a product of a particular way of looking at educating which places this in an individual context. A context where it may not fit.

The invisibility of learning independence

Collectively the student body is described as one characterised by years of learning dependancy on teachers in classrooms (Britzman, 1985 and 1986). However, the individualistic and deterministic viewpoint of mainstream education is one which **anticipates** rather than **discovers** this relationship. The education paradigm puts pupils into a dependancy relationship with teachers. Mainstream research confirms this position. Pupil careers **are not** characterised by years of sole learning dependency on teachers, except that some pupils define themselves to be so in some learning situations. **Total dependency** would lead to a situation in which teachers, in large classes, would have difficulty coping with their assumed tasks; especially in situations where demonstrations and lecturing techniques are avoided. Pupils are actually forced to (and do) turn to eachother quite alot in classrooms and other settings and confer and help eachother in significant ways.

Willis work (1977) on deviant school subcultures exemplifies this well. Willis gives examples of how the classroom anticulture of "the lads" operates through a look or glance from pupil to pupil. Beynon (1985) gives similar examples in his discussion of the establishment of classroom subcultures among pupils during early (initial) classroom encounters with different teachers. However, the focus on the deviant subcultures of schooling in these examples shouldnt deter us from considering similar cases inside normal proschool cultural mainstreams. For instance, as a teacher education student in 1987, I was able to experience, as a participant observer, the way students help eachother with "mainstream" activities. With such diverse tasks as "revising", understanding "key concepts", translating, problem solving, computer programming and literature references.

The individualistic and deterministic viewpoint of John and other mainstream educationalists and administrators, predicts that students should respond to requests to "shape" their coming education. Students respond to this but not in ways which can be anticipated by mainstream predictions. They respond collectively and actively within the settings themselves, not directly in individual response to tutor requests. In order to see and appreciate this one needs to break with the essentially individualistic notion of education promoted by the educational mainstream. A paradigm which is bolstered by a liberal humanist ideology. It is a perspective which prevents the protractor from seeing the ways in which students socialise tutors in classrooms as it only looks at education in terms of how students are to be socialised into the teacher role.

Student biography and student response

If student teachers have taken part in learning which is dependent on pupil-pupil (group) interactions and not teacher-pupil ones, then why do they define learning as being an outcome dependent on teacher pupil interaction and not pupil-pupil or group interaction? Why do students who have been "socialised in" a collective tradition behave as if they have been "socialised into" an individualistic one? These questions are pertinant to an understanding of the interplay between biography and response in the classroom. They highlight the inadequacy of the concept of student socialisation into a professional role and the conjectures which exist between "being there" and really "experiencing".

Phenomenologists speak of a phenomenological and a natural attitude. The latter is that which characterises the way we meet and treat life experiences normally whilst the former is one which bends consciousness back upon itself and robs the natural attitude of its proclivities (see for instance Schutz and Luckman, 1973). The natural attitude is characterised by preformed understandings which shape the ways in which new experiences are met and understood. We meet the world normally in a natural attitude.

The description of classroom interaction in relation to student-student patterns of learning dependancy as opposed to student-teacher ones, is one not picked up by the natural attitude within the mainstream paradigm because of this paradigms "natural" proclivity. The paradigm doesnt consider the former as really significant and tends to dismiss them to the peripheries of concern, to "hidden curriculum", or to studies of deviancy. Its only by robbing the consciousness of the deterministic bias of the mainstream understanding of educational interactions that the significance of student-student or pupil-pupil interaction can be understood.

Pupils in schools generally meet educational settings from within the natural attitude where "the object of consciousness" is something outside of consciousness itself. Within the cultural mainstream of the school that something is usually that designated as the object of the lesson or activity in which pupils are engaged. This forms the central part of the educational setting in question. The reason for this is that "socialisation" to the attitudes and values of the school is in essense "socialisation" to the mainstream paradigm of education (see also Willis, 1977).

Student teachers, as for the most part "successfully" socialised subjects, who met (meet) educational encounters in the natural attitude didnt (dont) consider the effects on consciousness of pupil-pupil patterns of interaction in classrooms as of significance on the outcomes of learning because these are seen in terms defined through its authority figures by the cultural mainstream of the school. They therefore define, **and see**, learning as a product of student-teacher or pupil-teacher dependency even though they depend on student-student interactions as much or more than student-teacher ones in learning engagements, and previously depended on pupil-pupil ones more than pupil-teacher ones. Mainstream education renders the teacher indispensible even though his/her impact on learning outcomes may be quite low.

Brtizmans earlier statement is inadequate rather than wrong, and a slight readjustment to it can show this. Rather than being a group of individuals characterised by years of individual learning dependency on teachers, the student teacher body represents a group who are characterised by a **common definition** of the existencial characteristics of (classroom) learning which sees learners in a relationship of individual dependency on teachers and a **common unlived experience** of being in a relationship characetrised by mutual and collective interdependency between learners and between learners and their teachers. Sandra, as a "deviant case" can throw some light on this.

Sandra has presented herself as a student who doesnt fit the theoretical desriptions which characterise researcher views of student relationships to their teacher education. For instance, whilst students generally describe themselves as being in dependent relationships with tutors Sandra opposes this and defines the situation as one of mutual inter-dependency and actually accuses tutors of being too forcefull and too **determinative** regarding the development of teacher education courses. Whilst most students seek guidance from tutors as to "where to go next" Sandra wants to decide herself which way to go and to discuss this with tutors and with other students. Sandra uses "we" not "I" when discussing the direction the education could/should take and "I" in relation to the transition from student to teacher role. However, whilst Sandra is an exception to the theoretical description of the structure of student understandings of teacher education she is an exception which would tend to confirm the effects of biography

Sandras educational background, especially her recent educational background, is different to that of the majority of students. Sandra differs in two significant respects. Firstly she studied for two years at a Folk High School (Folkhögskola), an experience which she describes as;

> "The most rewarding educational experience I have had. Not only did we learn about the subjects we studied, I studied music myself, but we learned about ourselves and eachother. ..It was an entirely different learning experience from gymnasium where teachers made decisions and we wrote down and recalled what they felt was important. Instead of that we decided together what might be worthwhile and then took responsibility for putting these decisions into motion ourselves. ..I was really worried about this at first. ..I, alot of us really, didnt think we'd be able to "pull it off" ..we were afraid but at the same time excited. ..It was a tremendous boost to our confidence to find out that we really could make these kinds of decision **and still learn something**. ..Learning without direct overbearance from teachers. ..Up untill I went to FHS I'd been what I would call a normal "good" student. I got good grades from the compulsory school and went into N (natural sciences) because it was the thing to do if you had good grades. I did what teachers felt I should do and learned the things they said we should learn without ever asking myself why. It wasnt untill I went to FHS that I needed to ask these questions."

However, it wasnt at FHS that Sandra fully articulated the grounds for her oppostion to "follow my leader" education. The FHS laid the grounds for an oppostion which she articulated first later on during a university education in educational theory (pedagogik).

> "I'm not going to say that the course at peda (dept. of ed.) was a good one because most of it wasnt. There wernt' very many of us that came back and took a second course for example, which probably speaks for itself. However, there were some good bits in among it. ..Relativism and realism, the sociology of knowledge and these kinds of areas were opened up to us. I started to look at my upper-secondary education in a theoretical sense and started to understand more why I prefered the FHS and also how natural it was to do so."

The synthesis of biography and setting

Student views of teaching are incomplete and seemingly derive from a kind of sympathetic introspectionism (Blumer, 1928 in Hammersley, 1989) which is turned onto their own classroom experiences as pupils.

> "You can tell a good teacher from a bad one by the pondus they bring with them into the classroom. Good teachers have respect for their pupils and they show it. For instance a good teacher always goes into a classroom well prepared if possible. That is with something to say and a positive way of saying it. ..Weve all had good teachers and hopefully its these which have left an impression on us and to who we

> try to relate. ..I dont know if you can make a good teacher, perhaps a good teacher simply is. But I think you can become a better teacher if you know what to teach and how to teach it, good factual knowledge and an array of ways of getting it across so pupils understand what you mean." (Thomas, interview)

> "There should be a special kind of test for teachers, like a driving test for drivers, only given regularly like a driving test should be. It should be a test that can say whether or not this or that teacher is sufficiently abreast of developments in the subject and of ways of getting that across to pupils. ..I cant understand all that stuff Anne and Tom go on about, process and such like. What good is it if theres nothing to get across and what difference does it make how you get it across as long as you do. If theres' nothing to teach theres no teaching and if pupils dont know more when youve finished than they did when you started theres no teaching either. Its as simple as that." (Steve, interview)

> "I agree with Anne and Tom in one sense, ..and that is that simply knowing about subject matter in and of itself is useless. It doesnt matter how much you know if you cant gear that in some way to what pupils understand and present it in ways which will help them understand better. ..Good subject knowledge is only a precursor and not a sufficient condition for good teaching, youve got to combine it with professional knowledge. ..Take "X" for instanse. X knows all there is to know about the subject but cant get it across whilst "Y" knows only half as much as X but can get all of it across. Its better to be like Y than like X but if X could get stuff across as well as Y then it would be better to be like X. Teacher education should aim to produce teachers like the new X, ..a synthesis of X and Y. " (Jane).

Student teachers depart from the way things have been for them in classrooms when they consider teacher education experiences and seem to support a teacher education which works towards making them "proficient" in relation to their definition of the reality of the classrooms they know about. This makes the student teacher a conservative professional being. In fact student teacher conservatism may be the biggest hinder to attempts to develop a more critical teacher education. A conservatism which derives from "biography" and a onesided "natural" protraction of teaching activity.

This can be seen in the above examples. These show how student views of teaching, because of an association to a presentationalism undergirding their earlier learning experiences where "the performance" as such was the central gestalt of "being a teacher", are incomplete and at the same time instrumental in founding the notion of teacher education as being about producing teachers "who can perform". Teacher education is seen as something which should provide access to the relevant subject matter and to ways of communicating this to pupils in classrooms. Student teachers are locked into a technical orientation toward teacher education before they ever arrive in teacher education settings. They are "prepared" to recieve content which isnt about technical aspects only if it can contribute, in their view, to their performance of the technical tasks which are involved in being a teacher.

In other words, a good number of student teachers (there has been **one** definite exception uncovered in this investigation among the 18 interviewed), as a result of an interplay of introspectionism and experience, **anticipate**; in teacher education, before it ever begins; practical instruction in the facts of the subjects they intend to teach and instruction in the ways in which these may be communicated in classrooms. They make these anticipations because of a firm conviction that only in this way can teacher education be effective as a means of producing teachers who can control (run) school classrooms. Courses (and parts of courses) which dont meet these expectations, or dont look as though they are going to, are appraised negatively and or resisted by students unless some alternative reward, such as the external reward of examination success which allows students to **show their qualities** (and gain praise for them), is placed between them and their experience. They want to be good (duktig), show that they are good and be told that they are good.

However, in this process of external rewarding student conceptualisations of education and of educational success and failure are further reduced to, or at least continuingly held down to, notions of being merely a product of the teachers performance in the classroom and the learners (innate) abilities. The teacher is seen as a performer who does his/her best to ensure that learners learn the subject content which he/she or a higher pedagogic authority generally, deem approrpiate for their concern. The "background features" of education, such as the social and political context of educational interactions, are missing. But it must be noted that students themselves have cut these away from their understanding of what teaching and teacher education is or should be about **before they enter** teacher education; even though teacher education curricula (some kinds) may encourage or reinforce this kind of neglect.

Even teacher education would seem to be seen in these terms by these students. That is as an outcome of individual struggle mounted on an individual dependency on tutors rather than as a product of a particular (kind of) political and social reality which obscures mutual interdependancy behind a shroud of individualism. An individualism which is "justified" by an educational agenda (voiced most clearly in Lgr 80) mounted on philosophic individualism. An individualism which both derives strength from and undergirds (see also Bourdieu and Passeron, 1977) liberalist notions of humankind and a liberalist notion of (democratic) society. As a result teacher education probably needs to address this problem first if the intentions it has to penetrate beyond technical matters of teacher preparation are (firstly) genuine and (secondly) are to be fulfilled.

Discussion

The previous two sections of the report have presented summarised examples of two sets of data. The respondent validated text summaries of two different groups of participants in teacher education. These two sections can perhaps very briefly be summarised as showing how the organisation of teacher education at Baysfield derives from organisational theory and may be administrativly conveniant (see Dianes text), in that it submits "ideology" to the preconditions of its fitting schedules and timetables (styckmönster) and has resulted in the projection of students into educational settings for which they are "unprepared".

However, these two sets of data also raise questions about some interesting educational issues. Three of these; **goal-diversity, ideological-diversity** and **conflict**; are to be considered here. As the first two of these can be subsumed under the third, as motors behind it, all three can perhaps be summed up by considering the ways in which conflict has developed, and been viewed and managed, in curriculum development on the course, according to those participating in it. I shall first present what is infered here by the terms goal-diversity etc., before analysing in more detail how conflict seems to have been managed on the course.

Goal-diversity: The respondent validated text summaries provide a general indication to the content of the entire data base for the investigation in relation to goal-diversity at Baysfield. A data base which, at first glance, points to the possibility of the superceeding of what might be regarded as the organisational goals of the upper reaches of teacher education administrative bureaucracy (The Government, UHÄ, The Ministry); at least as these are expressed in policy documents such as UHÄs National Plan and proposition 84/85: 122; by "local goals" which are inspired by the kinds of individual or "small group" ideologies, professional ideologies and pedagogical convictions which are articulated in Boards, commitees and teaching settings at Baysfield. These "new goals" often seem to represent educational values and ideals, as expressed by the organisation, when seen through the eyes of participants other than those at the top end of the hierachy and there is a chance therefore, that they are perhaps less "functional" than the "formal organisation" would like. However, both the "functionalism" of the goals of the "organisation" and their diffusion; to become less functional more diversified goals; may be nothing more than surface apparitions.

Ideological diversity: Both the development and "reciept" of course content at Baysfield, on this science course, seem (at a surface level) to have rested on ideological convictions of somewhat diverse character, and this may be used to explain the (aparent) multivariate goal-diversity identifiable in the different teacher educator and student accounts of this general science course which are exemplified by the diverse characters of the different respondent validated texts which have been prepared. However, **ideological diversity,** according to the way ideology has been defined in this investigation, can exist at two distinctly different levels (see also Liedman and Olausson, 1988). At the level of ideology as such (system of truths, values and norms at the societal level), or at the level of a professional ideology (truths, values and norms at an institutional level). Both of which contribute to undergird a practical philosophy of teaching (Goodman, 1984) which in its turn undergirds pedagogical convictions and, to a degree, the eventual shaping of educational interactions. And whilst the latter of the two is dependent on the former to some degree, there exists a degree of relative autonomy (Bourdieu and Passeron, 1977 and Brante, 1980) in the relationship in that it can be ajudged to exist at two levels; at a level of dependency (principally pertaining to the relationship between educational aims and ideological values) and a level of autonomy (particularly pertaining to the establishment of teaching methods and teaching content). In this investigation it is felt that the over-riding ideological convictions of participants have been relatively stable across the teacher educator and student group (4).

Institutional aims in the long term, in that they are concerned at least in part with the maintainance of the institution as a relatively autonomous institution (Bourdieu and Passeron, 1977), would be likely to be similar for members of the same institution in that they rest on similar assumptions derived from the shared beliefs of the members of that institution. Assumptions which inform, together with aims, the selection of educational content and method (level of autonomy). This investigation certainly gives some indications of this; perhaps even the level of autonomy is only partially autonomous? Furthermore, through relative autonomy, even the professional ideologies of participants would be stable to the extent that the majority of teacher educators and students obviously seek to fulfill similar long term societal aims (level of depedency). There are however a number of anomolies to be examined.

For instance, even when expressing different convictions about how to educate, almost all participants (students and teacher educators) have highlighted the role of the school in maintaining standards of living and for maintaining the competitiveness of Swedish industry on international markets. Most of them also see these as **necessarily** connected (education and/as development, see Fagerlind and Saha, 1983). In other words a common educational aim has resulted in different recommendations for educational praxis.

On the other hand, some participants (eg. Diane) are exceptions to this rule in that whilst they accept that this is how things seem to work at this time they want to change this. They put ecological survival at a priority level to the extent that they advocate an alternative life-style and view ecopolitics as a necessary political alternative to market politics. They also view education as necessary and significant for bringing about the kind of "global mind change" (see also Harman, in Gough, 1989) needed in order to bring about these changes. However, at the same time they see education in essentially identical process terms with traditional transmissionists. They only seek to change the content of the education to be given despite the fact that the methods of transmission pedagogy derive directly from the political structure which has brought about the kind of ecological catastrophies they set themselves against. Perhaps these anaomolies can be explained by looking at the interplay of the two levels of relative autonomy.

At the "level of autonomy", significant comparabilities exist in the assumptions of participants across the participant sample, such as those of "individual differences". Differences between pupils which are genuinely felt to "exist" by participants and genuinely felt to manifest themselves in differences in pupil performance, interest and ability (as measurable performance). These kinds of assumption combine with the above kinds of diversity to promote the anomolies noted in the data. The kinds of philosophic individualism which undergird the above assumptions (of individual differences) is a product of a particular way of looking at (or constructing) reality, but the "greens" in this investigation havnt grasped this point because they are also firmly entrenched in the mainstream educational paradigm which promotes philosophic individualism. By combining a "green concern" with a notion of individualism, Diane and likeminied participants arrive at an individually ordered transmissionist education built around ecopolitical concerns. The student group have their biographies which exercise a modifying force on the ways in which they can think about teaching and education at this time.

Perhaps some paradoxes, anomolies and diversities do genuinely relate to diverse professional ideologies. The process and product emphasis of Anne and Tom and Bill and Dave respectively for example. On the other hand much of the goal-diversity may only be apparent anyway. Afterall, Anne and Toms progressivism derives directly from liberalist notions of humankind and doesnt seek to emancipate oppressed classes in society but rather to give individuals a chance to express their personal human qualities. In a sense Bill and Dave and Chris and Maureen on the one hand and Anne and Tom on the other are still concerned with teaching as a technical rather than critical profession in the sense that they are all concerned with teachers running other peoples schools. What has become visable diversity might only be a phantom diversity (skenbild) rather than a foundational diversity built upon genuinely divergent professional ideologies. It may be that the goal diversity at Baysfield is in fact only apparent and not real and built upon diverging professional convictions rather than alternative professional ideologies.

On the other hand some kind of professional conflict; within and between the two sets of participants who have been interviewed; is apparent in the conflicting sets of attitudes and values toward education and teacher education which they have shown. Attitudes and values which at a professional level are incompatible (dependent on mutually excluding theoretical or practical standpoints) are apparent in the data collected. It is also apparent from the data that it is in effect through the management of conflict that changes are instilled into the programme as part of the negotiative process behind the establishment of pedagogy.

Managing conflict: (1) The "voting with feet strategy"

Conflict can be managed in educational settings in a variety of ways. A traditional university approach to recalcitrant students, which often represents the university "version" of or concession to democracy in and through learning, is to "shut out" conflict from teaching situations by inviting students to "vote with their feet" and either attend or not attend lectures.

What is offered to students by voting with feet strategies is a simple system of option choice. The establishment of which follows a sequence of stages. (1) Through testing students as an after the fact activity (as by a final "objective test") the material content of instruction is made subject to direct evaluation. (2) A programme of instruction "in" the material content of the course is organised by tutors and/or other curriculum administrators. (3) Students are invited to partake of instruction in the material content of the course but arnt' forced to do so (non-obligatory attendence). Students are (made) aware of the conditions of evaluation and the risk of exclusion from further studies in the eventuality of an inadequate performance on their part in it. This is quite clearly an approach to conflict management that is likely to excert a conserving force on curriculum development in that it surpresses and excludes conflict and therby anchors curriculum change to the pedagogic authoritys' considerations of what they (it) feel(s) should be changed.

Direct testing is how this course was evaluated (with the exception of Anne and Toms components) according to those taking part in it (see for instance Sandras text summary). So although no educator emphasised voting with feet in their accounting of the course (in fact attendence was obligatory as Emma and Barbara draw attention to), the relationship between the material presented and the way in which it was tested (see Emma and Barbaras and Janice and Janes accounts) implied that the strategy could be used without the students performance in the final evaluation being jeopardised.

According to Emma and Barbara at least one student "profited" by the relationship between the material tested and the way it was presented on the course by relying on "reading for the exam as opposed to actively participating in lectures and seminars which didnt contribute in any way directly to the final assessment" (Emma, interview).

Examinations and the shaping of educational interactions

The direct testing of "objective" knowledge enables voting with feet strategies to be successfully employed by students in the event that they are not "punished" by authority for not attending lectures, seminars and so on, and success in the objective test renders the exclusion of students from subsequent instruction problematic on any other grounds, as the student concerned has shown him/herself capable of mastering the knowledge adjudged by pedagogic authority as worthy of testing. Such exclusions are therefore hard to objectify and can be adjudged as unecessary shows of arbitrary force on the part of the organising authority.

> "If you pass the exam then you should pass the course in my opinion, as long as you havnt missed too many lectures of course, ..there must be some measure of control. ..I mean the exam has to be the final test doesnt it. They (the tutors) know what there is to learn in the subject and also which of that is most important. If they test us on that and we pass then of course we must be good enough in their opinion to go on. ..If they make a test and we pass it what right do they then have to stop us from going on." (Thomas, interview)

Examinations exert a powerfull influence on power balances. Initially in favour of pedagogic authority figures such as teacher educators. But as Thomas points out above this does have a kick back in cases where a student who has a poor attendence record does well in the tutor test. However, this rite of passage attitude which final examinations support, is not the only problem with objective testing, which in addition also exerts a controlling force on curriculum development generally, and according to the findings of this investigation, also effects a modifying force on the ways students participate on courses (see for instance Dianes text) such that this participation can be viewed as passive from the perspective of critical reflection.

The student group are well aware of the internal logic of objective testing as a result of a number of years experience of it, particularly from the upper-secondary school. Students are aware that the curriculum must (ought to) concentrate on the mediation of the kinds of knowledge to be tested if the relationship between course content and evaluation is to be maintained. In fact their criticisms of the final examination show exactly this understanding.

> "The final examination bore no relationship to the expressed ideality of the course. With the exception of a couple of questions on chemistry the big picture perspective was absent. ..Admitedly it is

> hard to test the kind of integrated ecological understanding of the kind advanced by the course syllabus but this exam was out of order and bore no relationship to what tutors kept on saying about it." (Bob, in interview)

> "Everything was so mixed up in the end. Tutors had said one thing and done another all along. ..I mean they had talked about the big picture alternative but then taught in subject centered terms. When it came to the exam it just got worse They said the questions were going to be based on subject overarching principles and then they asked subject specific questions." (Janice, interview)

> "In the end I gave up trying to find out what type of questions were going to come up in the exam and just read the course literature. We tried to get some idea from tutors by asking them questions but in the event we got any answers at all these were conflicting ones." (Jane, interview. Jane passed the exam first time.)

These three statements give a sense of the anxiety students often have in the face of an examination which they are worried about. Each of the above three students were interviewed just before the examination results became puplic. However the next two quotes come from students immediately after the publication of exam results. The students were "successfull" in the exam in that they passed it. However, what is more clearly highlighted than "general elation" is that what the students are most happy about is having their "exam sussing strategy" confirmed (stategies for finding out what examinations are likely to be like; see Beynon, 1985, on sussing strategies). This is the most positive aspect for them as it gives them hope that they can "suss" even future examinations.

> "Normally you can tell what kinds of questions are likely to come up or at least get a sense of them from the way tutors present material and go through it. Although there were problems in this course because of the difference between what was said and what was in the main done you could still identify who would ask what types of question. ..As soon as I knew that we were going to get a load of different subject tutors, a diferent one for each bit of the course, I guessed that they would each most likely compose one or two questions for the final exam. ..In any event its not hard to get that kind of information. All you have to do is ask them if theyre going to set an exam question, what its likely to be like and what its likely to be about. ..I mean they want us to do well on their questions cos it reflects badly on them as teachers or on the interest factor of their stuff or both if we do badly on just their question. ..As soon as you make this decision (that each tutor is going to set one or two questions) its just a case of weedling out what types of question they are likely to ask." (Thomas, interview)

> "I knew Chris would come with the kind of general applied question and Bill would come with a very specific subject related one. You could tell from the literature they used and the way they lectured and what

> they lectured about. ..There were different problems to upper-secondary when it came to predicting tests and questions; principally in that there was alot of stuff spread across a number of topics and there was no cribtest (no former paper) to look at to get a sense of the types of question. ..But these problems werent insurmountable." (Pete, interview)

The above statements would seem to confirm that students are concerned to find out about whats likely to come up on a final examination and that they are likely to use lectures and seminars as "opportunities to extract relevant information from tutors" (Jocelyn) about this. I want to argue that this process, although instigating student activity in classrooms, has effectively militated against certain kinds of active participation on this course by them. I base this claim on the evidence of this investigation which shows three things as particularly significant to the relationship between examinations and "active" participation.

Firstly, the final examination has reinforced students proclivity to define the existance of "objectively" right answers (see also Beach 1989 and Wernersson, 1990, forthcoming) and to see all answers to all questions as objectively measurable. Something which, when alied to their definite knowledge that an objective test was to be used on the course, has (a) encouraged students in educational interactions to (re)evaluate the content of instruction in terms of the access it gives to the right answers to the questions (which are likely to be) asked on the final examination and (b) to continually assess their participation in and the quality of instruction in terms of its effectiveness in relation to these criteria.

In the above negotiative process a conformative student role (which is essentially passive in critical terms) has been established. In this role non-conformation to the conditions of participation laid down by authority on the part of the student is actively militated against in that certain types of question are implicitely encouraged whilst others are discriminated against. Tutors exclude certain types of question and include others in their deliberations over which content to include in instruction. Students are encouraged by final assessment practices only to be interested in the kinds of knowledge which tutors select as (most) valid as it is these which are most likely to be tested. They are furthermore only encouraged to consider these types of knowledge as interesting in terms of the ways tutors indicate them to be so as they know that it is in these ways that questions on examinations are likely to be formed. Testing becomes part of a process of replication of tutors knowledge by students (see Sandras text).

However "engaged" students might be in classroom activity of the above kind student participation in such types of setting is still in one sense passive, as the assumptions upon which the knowledge mediated rests are never challenged by them in "their role" as **absorbers of information**. Science itself didnt' "go on trial" on the course, and neither did the notion of "democratically organised science education", only the technical facts "communicated in the instruction process", their "testability" and their suitability for prospective teachers, have been deliberated over. Students wouldnt be expected, according to interviews, to ask questions about the sociological or epistemological status of the knowledge transmitted as part of a lecture on the rate of electron flow for instance. Knowing that electrons move and knowing the formula for calculating the rate of movement, so that this can be used to answer possible examination questions, were considered more important.

> "You have to be active in lectures in one sense cos theres' often **alot of stuff which you dont need**. In fact in some cases its better to read up afterwards to get out just what you are likely to need **for revision purposes**. ..These lecturers have been pretty good I think. There hasnt been so much "flabby talk" (flum), if anything quite the reverse, lectures have been too conceptually intense. ..Normally though you have **to select the stuff** from a lecture which you need from that which you dont. ..I dont usually write down everything a lecturer says like some do. Rather I just take the important things **like definitions, laws and formula**. ..The things that you know from experience that you are **likely to get in a test** afterwards." (Steve, interview, my emphases).

Summary: The voting with feet strategy seems to have survived the "restructuring" of subject theory courses into subject studies and seems to have overlived the relocation of university subject theory instruction to school of education lecture theatres, and some students (at least one according to interview data) have been able to absent themselves from lectures and seminars without seemingly suffering in any "intellectual sense". At least if the "university measure" of direct testing is a reliable one. The student passed the exam and hasnt been exempted from further study because of a poor attendance record.

There are I think two clear reasons why voting with feet survives. One is obviously student biography which encourages the type of instruction upon which direct testing can be built and also encourages students to concentrate on the "performance aspects" of teacher education (Dianes text). This leads in its turn into the main reason why it has survived which is that the major cornerstone of the voting with feet strategy, the objective test (and all it brings with it), has been maintained as the major means of evaluating student performance on the course and the force major in student eyes of exclusion from subsequent studies.

Although this is not noticably the case if one compares to traditional subject theory courses as university educators may have a tendancy to do, students have been essentially conformative in their student role. Not in the sense that

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they havent been actively engaged in educational interactions but rather that this engagement has been "framed" by pedagogic authority. Students have been active in that they have **solicited information** from tutors and sought for and actively selected out that from the **content given** which it might be worth "setting ones stall out for" (see Dianes text on project work) in order to pass the course. Evaluating the course by means of an objective test and organising instruction accordingly has played a significant part in encouraging student participation to proceed in this way. Students havnt been encouraged to question the content of the course from oppostional standpoints, and havnt done so as long as it has remained within the framework of the presentationalist definition of teaching which they operate from.

What is at issue then, when voting with feet strategies are implicitely suitable for courses, even if ab verbatim passionately discouraged (or even forbidden) by tutors, is not simply the physical presence of students during periods of instruction, but rather which knowledge is **selected** as suitable for transmission by tutors and how particular views of the world and or particular ideas about teaching are accepted by students without regard for alternative points of view; management of conflict by **exclusion**. Here the authority of the knowledge held and mediated by tutors is not questioned as such. In fact any tendancy which a student might have to introduce such questions is **suppressed** by them to make way for more of the types of question which give access to which knowledge is considered worthy by the mediating subculture of teacher educators. What is at stake is is how the student should go about attaining this knowledge and if the student is "good enough" or has the kind of qualities and personal self discipline which are needed to do so.

Both student and staff accounts of the course would indicate that this is what has been at issue here in the main. It is a condition very much at loggerheads with the kind of education which policy documents seem to claim to want to engender. Even though students have been forced to physically attend the course, it has been closed, because of its very nature, to any **inquisitiveness regarding the status of the knowledge mediated** which they might have had. The final examination, in the way it has combined with biographical factors, has been instrumental in this process of closure. The highly conjecturous nature of obligatory particiapation combined with final examinations, drawn up by Emma and Barbara in their interview, is partially addressed in the following statement by Pete.

> "Obligatory participation on this course is a bit of a joke isnt it. ..I mean I can understand why particpatory attendence could be a good thing in a discussion course like on parts of the introductory course, but not on a course like this where all that is at stake is predicting what kind of questions are going to be asked on a final exam.

> ...We have course books and topics for lectures and so on, you could more or less predict what most of them (lecturers) were going to talk about from the title of the lecture and chapters in the books. ..The questions on an exam cant be that much different from whats in books when lectures are concerned with subject facts. Theres' no need to go to all the lectures to pass the exam. ..As not all participation is open to student influence and doesnt really call on students to be active in lectures it doesnt give you anymore than reading in a book would. ...I can understand people not going to all the lectures on the course. I have more difficulty understanding why they (course administrators) enforce obligatory attendence for all the course, unless theyre' afraid that we just wouldnt turn up at all otherwise."

It is very clear from the student accounts that a great deal of their attention has been taken up by "passing the exam". This isnt all that surprising when one considers that in order to pass the course they have to first pass the exam and that in order to participate in the next science course they have to have passed the first one. In short the examination has engendered a harshness and dislocation of studies such that what is emphasised in the learning enterprise, **at least as far as students are concerned**, is not the intellectual growth of participants but "control over the direction of their professional development" (Diane). Albeit so that students might "in the main prefer to have an examination" (CP) and that indeed "they might feel cheated when there isnt one" (ibid) and also "that in such case the examination has to be fair" (Dave Turpin) and even if, "this kind of testing is still the most fair and therefore the most suitable" (ibid), this doesnt explain **why** the education system has examinations; especially when they result in outcomes which are "out of line" with what seems to be indicated in general policy. Examinations are about **authority** control, the professional **development** of student teachers should perhaps be about "community control".

Managing conflict: (2) "Giving in"

As well as being "censored" in the combined control purpose which the interplay of biography, understanding of purpose and final examinations seems to lead to, and excluded by such strategies as voting with feet; conflicts in educational settings can be appeased through one side or other in the conflict giving in to the pressures exerted by other parties. For example, the representatives of formal authority (the teacher educators) can give in to student demands and "give them what they want".

In this investigation students report two things of significance in direct relation to this issue. Firstly, that they were generally satisfied with alot of the material presented, yet secondly that they werent given any opportunity to influence the development of this material. Sandra is poignant on these issues but even Diane draws attention to the idea that although teacher education authority "officially" invites student critisism, tutors and administrators actually make no effort to **find out** what students really think about the courses they participate in. So, point one is that conflict seems to have been excluded from most of the course components by the use of an examination system (which is what students want, CP) and which has tested their aquisition of the kinds of knowledge which they have wanted to be instructed in (roughly speaking).

This has been reasoned through in the last two or three pages of this report where what is implied is that although the course swept by student considerations and paid little heed to what they actually felt, it was **more or less** compliant with what the majority of them actually did want. Which brings us to point two, that the course, by being structured in the main around presentational items; a subject content which was "more or less" relatable to school issues, and a "curriculum theory" (didaktik) which generally showed how; generally gave students what they wanted. Chris and Maureens content, comprising subject content which was **most obviously** relevant to school content and curriculum theory content which **most directly** showed how such content could be taught in schools (especially by 4-9 students); as the "most accepted" content, would highlight this. As would the general rejection of Tom and Annes content. Anne and Toms content being the exception which proves the rule in this case. Anne and Toms content wasnt obviously presentational but nor was it acceptable to our Weberian "ideal type" of student teacher. Anne and Tom also say that they were forced to give way on some issues and compromise what they had originally intended to deal with on the course.

Managing conflict: (3) Opposition

Other tutors dont seem quite so obviously to have been forced into this position. They havnt needed to give in because in a sense, by structuring content for instruction in a very traditional way, they have already done so. The instruction they arrive at is very much in accordance with what student biography would lead students to anticipate as teacher education subject studies. In fact, Chris and Maureens content actually seems to have overreached what was expected. Chris and Maureen, in that they arrived at a definite subject structure and channeled all learning and instruction into that structure, structured content for instruction in a similar way to Dave and Bill. The subject structure itself was different to the traditional discipline in that it was directly informed by the contents of the schools national curriculum. This also made it more obviously suitable for school teachers in the students eyes.

A more cognisant approach to dealing with conflict than either giving in to it, supressing it or ignoring it, might be one that respects the demands that students make and the criticisms which they lodge but which actively and openly sets itself against them in order to force them to interrogate their own assumptions rather than passively **giving in themselves to what they feel** may be right and proper. Perhaps Anne and Toms intended approach comes near to this ideal. The intellectual gains of this approach for student teachers arise on the basis of its encouraging a dialectic examination by students of their current professional ideals; a critical reflection. This, according to Sockett, is a crucial part of becoming a teacher:

> "(student teachers) live and work in a framework of contrary understanding: To grasp that they must not only learn to pay close attention to the content of seminars, to the way they are taught, but set out to challenge the assumptions embedded in the pedagogy and the practice they encounter (and have previously encountered, DB) as learners." (Sockett, 1985, in Tickle, 1989)

As the current status of student teacher professionalism is essentially presentationalist, giving in to student demands at this stage of their development would be tantamount to setting a straightjacket around curriculum development on the course. Anne and Tom have tried to render the professional assumptions which student teachers make problematic. Unfortunately students have either rejected the idea as "a waste of time" (an unecessary agenda) or they havnt understood the purpose of Anne and Toms teaching. They are in some way missinformed about what Anne and Tom set out to acheive, which, as I have interpreted this to be, is summed up, in the following statement by Sockett.

> "We can shut ourselves in an empty classroom practicing our blackboard writing. We can have critics or supervisors watch out particularly for the way we handle childrens answers ..but if we must use our judgement when we apply our skills, the route to the improvement of performance lies first in practice with **judgements and critical reflection,** and later in **systematic self analysis**." (in Tickle, 1989, my emph.)

Im' not trying to blame students for the lack of impact of Anne and Toms content, nor am I saying that Anne and Tom are right and everyone else is wrong. I think the point I am trying to make is that Anne and Toms content had a developmental purpose which has been missunderstood by both students and by their own collegues on the course and also rejected by them as it didnt fit in with their ideals as to what constitutes "professional" teaching. Anne and Toms content didnt fail because it was bad but because it didnt fit in with the the values that are central and meaningfull in the professional ideologies of other participants.

Anne and Toms ideas are different to their collegues in terms of the professional development of teachers. However, I cant identify any difference as regards their communicated understanding of the purpose and ultimate aims of education nor of the role of the school and education in society.

Anne and Tom are trying to encourage student teachers to be critical of classroom pedagogy, but in an essentially professionally insular sense I feel, in that they dont try to reach outside the four walls of the classroom with the professional reflection they try to promote. Anne and Tom dont seem to spend time considering, together with students, the political nature of education nor the political characteristics of classroom interaction.

Education is a political activity, and it is reasonable to assume that only by becoming politically reflective can student teachers attain a standard of professionalism which would allow them to critically monitor their teaching. Albeitso, that perhaps the biggest hinder to a political emancipation of the profession lies within the taken for granted beliefs about educating held by the student body, the kind of professional reflection promoted by Anne and Tom is unlikely to be significantly contributive, and may in fact be harmfull, to the political emancipation of student teachers. Political emancipation is **necessary** if prospective teachers are to become fully professionally reflective. Tom and Annes curriculum theory actually fights against this as it doesnt examine the political discourse which emerges from classroom interaction and characterises what forms of authority, orders or representation, forms of moral regulation, and versions of the past and future are legitimated, passed on and debated in science teaching (see also Giroux, 1985). Tom and Annes curriculum theory actually undergirds a view of teaching as value free discourse and of teachers as free floating agents who are detached from society in that they perform a type of labour which is seen as objective and apolitical.

Conceptions and Conjectures:
A way of summing up

In accordance with the assumptions (a) that education is part of the total culture of society rather than something which exists separately from that culture and that as such it should be studied as part of a greater social and political reality and not in isolation from it and (b) that people are actively related to culture; including that part of total culture called education, rather than passive recipients of it, in that they actively seek to fashion and shape culture in order to make it fit the definitions of reality which they hold; curricula, such as the curriculum of the course at the center of this investigation, rather than being the kinds of ends/means model of "top dog organisational theory", are things which are formed within, and essentially comprise of, continual processes of negotiation and contestation across the range of settings which are related to them. Curricula form arenas where processes of negotiation which give meaning to beliefs, language, rituals and knowledge (Smyth, 1989) about education and educating are played out and transformed into curriculum development activity. Actor appreciations of curriculum development activity, as extracted from accounts of the course rendered by them during interview, form the database for this investigation. The investigation is thus an interview study which focusses on curriculum development from a participant perspective.

In the following and final section of the report, I want to attempt to sum up the database in relation to the proposed professional development of primary (4-7) teachers. The analysis is cursory and breif, so as not to become too conceptually dense and confusing. It emphasises the primary grades as it was specifically for these grades that the course which the investigation is built upon was designed. In making this analysis I will call upon the distinction made earlier between technical and moral-political teacher education and upon concepts of "extended" teacher professionalism developed by Zeichner (1986) and Van Manen (1982).

The questions that one might ask in relation to this analytical task are many. Two which are of obvious significance however are, firstly, what kind of teacher professionalism are subject studies at Baysfield claiming to develop and how? And, secondly what kind are they likely to allow? In line with symbolic interactionist research; where the symbolic representations of the researcher necessarily need to be built upon understandings of the intentionality of the researched (capture the horisons of the researched), the task is gòing to be tackled firstly at the level of subjective rationality. That is the task will be approached from the perspective of the percieved rationality of the actors behind the curriculum developments in contemporary teacher education who have been interviewed. Partly by looking at the rationality which they indicate in their own curriculum development work and by looking at what teacher educators would seem, by their statements, to want to encourage as professional behaviour within student teacher groups. Only after this can an analysis, in the form of a comparative analysis built upon Van Manens etcs. concepts, be attempted. The summary is divided into a number of subsections divided by what are hopefully suitable subheadings. "Green" and "reform" politics are focussed upon within the summary.

Reflective Professionalism

One of the central features of the LUT recommendations and of the Teacher Education Reform Act, is the proclamation of the need to produce a generation of "reflective professionals" for work in the country's schools. These recommendations have been put into practice in very particular ways on this particular course.

In order to be critically reflective teachers are required to stand back from the "habitualiness" of their teaching (Smythe, 1989) and to ask pointed questions about what they do and why. In short, they must challenge, doubt and even reject the pedagogy on which their day to day activity as "teacher" is gounded. In other words they need to distance themselves from their activities as teachers (Friere, 1972) in order to **understand** the reasons behind them, by experiencing "the extraordinary experience of the ordinary" (Shor, in Smyth, 1989).

At Baysfield reflection seems to be the "reassessment" of the suitability of teacher activity in relation to the learning outcomes which are desired of a particular course of instruction. That teachers may "theorise about the nature of their work" (TL) and the educational purpose this may relate to so that they may come to "understand the classroom constraints which impose limits on their activity and which **must** be removed if they are to be able to effect any substancial changes on learning outcomes" (AJ). In other words there would seem to be certain rules to teaching a particuar content which must be followed, and these rules would seem to be in part dependent on "frames" which exert a powerfull influence on classroom outcomes. Prospective teachers would seem to need to become aware of these, from the Baysfield perspective, if they are to understand the restraints which they are going to work under and how these can be dealt with. In fact the whole idea of professional reflection at Baysfield seems to be locked up in reflection over the consequences of "frame factors" (Lundgren, 1972) which restrict the range and effects of classroom innovations. As such they are also locked up in what is systematic reflection over factors which have been derived from transmission pedagogy and which therefore have some dependency on this tradition. This kind of reflection falls short reflection within critical pedagogy.

According to a critical moral-political teacher education, the true purpose of any critical professional reflection by teachers must be the development or furtherment of the kind of understanding which would enable them to break the chains of alienation which might be imposed upon them by the "mechanistic" nature of a daily routine (Bruss and Macedo, 1985, in Smyth, 1989). Reflection over frame factors in the above kind of sense, doesnt contribute to this, as it is classroom centered and doesnt encourage (student) teachers to distance themselves from and theorise about the antecedent social, political and cultural "restraints" which in part shape teaching. By ignoring the social and political dimensions of classroom discourse, nor does it then enable teachers to be off with these restraints.

In other words, the kind of reflection which seems to be encouraged at Baysfield is not concerned with teachers as agents of change within the educational system, but rather with how to make the system run more effectively. It is therefore locked up in a technical orientation to schools and schooling. By focussing reflection over **what it means to be a teacher** in this way, teacher education at Baysfield is hardly likely to be able to foster students to be sufficiently critical, or sufficiently critical over a broad register of what it means to be an educator, such that they may significantly transform their work as teachers. What is possible is reflection over the narrow range of classroom variables and their interrelationships with eachother. A kind of technical rationality (Zeichner and Liston, 1987).

> "What students should be able to reflect upon in relation to subject studies are the relationships between subject facts and what pupils understand about these, as well as how one as a teacher can elevate these pupil understandings. ...The kind of subject studies you are talking about arnt the ones most needed by (beginning) teachers when they go out into schools to teach pupils. ..The relationship of subjects to society and the historical development of disciplines may be interesting to know but it isnt necessary knowledge for (beginning) teachers nor something which we can expect students to grasp at this stage of their career development. ..They dont understand the subjects as yet, ..we cant expect them to understand those kinds of relationship." (Geoff Pike, curriculum administrator, po. data)

The kind of reflectivity which is to be encouraged according to the above is hardly that which would encourage student teachers to adopt a morally and politically critical view of teaching, nor would it be likely to encourage them to locate the teaching profession in its "wider social and cultural structures" (Smyth, 1989). But if subject studies are to contribute to the professional development of teachers in an integral way, then the pod. of subject studies must surely be brought around so that the professional attitudes toward reflection which steep subject studies fit in with those of the programme of education as a whole. If the intention is a more extended reflective professionalism, a reflective professionalism which is not just soldered onto societal issues, then extended reflection must also characterise curriculum development and subject matter on subject studies courses. In order to do this these courses need to address different questions than they do today. Rather than considering "didactics" and the establishment of didactic theories students and teacher educators may need to consider:

> Where the ideas which are embodied in science teaching come from historically and how they come to be appropriated by teachers in classrooms with pupils in the ways they are?
> Why they continue to be endorsed?
> Whose interests are served by them?
> What power relationships are involved in their execution?
> How their fundamental ideals influence teacher-pupil relationships?
> And how one might use knowledge about teaching, disciplines, the teaching subjects and subject teaching, in order to work differently? (after Smyth, 1987 in Smyth, 1989)

It is questionable if the reflective professionalism extended to this course will contribute to the articulation of the above kinds of questions by students.

The apolitical and dehistorising bearing of subject studies and its implications for the politics of reform

According to the database (including text summaries), schooling and the science subjects are fragmentarily represented in teacher education, in that both are presented in such a way as to emphasise their relative independence from the political framework within which their recent historical development is sited.

In the case of the depolitisation of schooling, this has come about through an interplay of at least two factors. On the one hand there has been an overconcentration within curriculum theory on matters of classroom technical relevance and this has "reacted with" a student professional preconviction which sees teaching in "presentationalist" terms and teacher education in instrumentalist ones. Teacher education **hasnt made** students see education in politically neutral terms but **neither has it stopped them from doing so**. Teacher education has acted "normatively" toward the obvious social and political bias embraced within the education and social systems in this country. This has meant that their political bias, and indeed the majority of students own political bias, has remained **invisible** to the student group.

Similarly in subject theory, by teaching "about the facts of the subjects" and "the scientific method", but not about the sociology and politics of (subject) knowledge, the relative importance of the internal logic of the discipline in determining its own content is overemphasised, and the science disciplines have remained "bodies of objective and politically independent knowledge" in student eyes. Science and the production of scientific knowledge has remained in politically neutral terms, as has the work of scientists and **their own** selfimage as a prospective science teacher.

In other words, with particular regard to science subjects, schooling would seem to have been given both an ahistorical and apolitical charater in the kinds of classroom engagement which have characterised teaching settings on this course; at least according to statements made by those who have participated in it. This, despite the obvious and powerfull political undercurrents to both the history of the education system in this country and the science subjects themselves. Something which is clearly pseudo-representative and dangerous professionally as it frames the projected activity of science teachers in the kind of imagery which views learning as an outcome of a kind of value free discourse which is led by "neutral" and politically independent intellectuals and thereby "blames the victims" (pupils and teachers) for any eventual learning difficulties.

> "Teachers try not to be biased and I feel that principally schooling is a neutral process. ..Providing the teacher can present lesson content in ways which make it interesting for pupils and in ways which

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> characterise good relationships, lessons should be productive and the pupils do have the opportunity to show what they go for and **thereby fulfill their potentialities**. ..In a good classroom which is characterised by that kind of organisation all pupils have a chance to learn the subject matter to the best of their abilities." (Steve)

Reflection and understanding

Students have little chance of understanding the nature of the activities in which they are engaged and cant reflect upon the plausible educational consequences of these in any broad sense. Thus the professional reflection ideal at Baysfield, is held down to considerations of subject matter content in relation to the (individual) charateristics of pupils as learners and teachers **presentational abilities** and possibilities. However, schools are far from politically neutral places where a pupils "natural ability" is allowed to show itself. In fact the majority of evidence would seem to suggest that schools are sites of social selection and recruitment (eg. Willis, 1977) in that they inculcate the attitudes and values of the cultural hegemony (Bourdieu and Passeron, 1977) and are therefore also politically cultivating and potentially politically recruitive (Englund, 1986).

In short, what schools would appear from both micro and macro-studies to do (Willis 1977 and Carnoy and Levin 1976), is socialise youngsters into ways of thinking which are concomitant with the maintainance of a social order. A social order furthermore, whose development has been intimately bound up with control over the development of science and technology and where, in educational terms, the technological interests of corporate capitalism is successively replacing the colonial interests of the imperialist state. Something which is obvious when the educational agendas of countries like Sweden are compared to those of countries like Irak and something which is very real to this course which seeks to "integrate" technology into its subject matter. However, political interrogation of science curricula has no place in science education subject studies according to curriculum developers at Baysfield and has had no place in this particular subject studies course.

> "Its all well and good you educationalists coming with high flying kinds of educational theory ...but what good is it to me! How can these kinds of things help me to teach chemistry in seventh grade. ..Thats just how it was with their stuff (Anne and Tom), ..they told us all about how we have to make sure the stuff we teach is right (at the right level) for the pupils we teach and then they taught us in far too simple ways. They pitched things at us at far too low a level, ..it (their stuff) didnt help us in the way Chris and Maureens chemistry did. Chris and Maureen showed us what to teach and how as well as telling us why we should teach just that kind of stuff in those kinds of way." (Steve, interview)

> "Im' not here to learn that kind of thing (the politics of education) Im' here to learn how to teach. ..To learn the facts of subject content so that I can decide what are right and wrong ways of explaining phenomina (understanding pupils explanations) and how to use my understanding of this to find out how pupils understand content. ..To decide what to teach one needs to know what there is to know about a subject and also what different ways it can be understood or missunderstood in. The idea is to teach so that its understood in the right not the wrong ways." (Lynne, interview)

> "I want to learn how to transform (omsätta) what I know into content which I can use in schools. How to develop interesting lessons around stuff which is accessible to pupils, so that pupils can learn something. Afterall thats what teaching is all about isnt it! ..No of course I dont know all there is to know about science and technology and of course I do need to keep up to date in developments in subject theory but I maybe do know enough to teach in the middle grades. ..I think for a course like this (for teachers for the middle grades) we need to know what kinds of subjects are studied in schools and how one makes complicated facts in these areas simple enough for pupils in schools to understand without simplyfying them so they become missleading, inaccurate or simply wrong." (Thomas, interview)

These are examples of the kind of reduction of the teaching/learning problem which subject studies at Baysfield reinforce by **feeding** rather than **correcting** the kinds of understanding of subject stuctures and schooling processes on which they found. Baysfield teacher education continues to undergird a meritocratic education system. This has powerfull consequences for the politics of reform. For, rather than being concerned about transforming society and ending social inequalities, merotocratic education is concerned with "justifying" current patterns of power and wealth distribution by obscuring the means by which they come into being (see also Bourdieu and Passeron, 1977).

The role of biography

Teacher educators and curriculum administrators have adopted a "tabula rasa" attitude toward students when planning courses and have ignored the current student conceptualisation of **science** teaching as the neutral or "value free" mediation of objective knowledge. This is problematic, for, by not starting from where students are at with their future profession, but by rather assuming that they are all at the same point, and that that point is in effect either no-where (students have no professional understanding) or concommitant with the expected learning outcomes of a previous teacher education course (students are in tune with **our** view of the professional role), future teacher education may be attempting to inculcate new values onto old values which dont fit and, at times, in ways which are derived from old rather than new perspectives.

Teacher educators miss the point that by not opposing students they allow missunderstandings to persist and exclude or distort the intentionality behind new teacher education content. This becomes "masked behind false role play in a false role play situation" (Sandra). Further, by teaching in ways which are not unambiguously opposed to transmissionism, teacher educators reinforce student notions of value free teaching and thus they further the idea that subjects consist of "value free" facts which are to be communicated in "value free" discourse to pupils in classrooms. Teacher educators have ignored the fact of student proclivity and that students are **actively** selective about **what to learn;** despite the fact that they **say** in their teaching that "human kind" is "active and creative" and learning likewise. In fact, by saying on the one hand that learning and learners are active and creative, and then laying out teaching according to a transmission pedagogy, teacher educators effectively defuse the classroom implications of active and creative learning and undermine its classroom significance.

Anne and Tom seem to be an exception on this course, in that they dont seem to depart from a tabula rasa position and may have tried to teach according to the assumption that the active engagement of learners is a genuine fact of all teaching settings. However they failed with their content, at least in the sense that their content was rejected by most of the students and that all but a very few students continue to see teaching in presentationalist terms. Anne and Tom did try to teach as if students did have an attitude toward teaching; indeed even an attitude which was at least potentially opposed to their own.

> "We (teacher educators generally) know that students arent tabula rasa but they still get treated as if they are. ..Its inherrant in the way content on teacher education courses is normally structured and delivered, especially subject matter. ..We (Anne and Tom) tried to teach according to constructivist principles but students rejected this. ...we were prepared for student opposition and set out from the perspective that some students would have ideas about teaching which were totally opposed to what we were going to do and what we were going to say about teaching ..but I dont think we were prepared for **how powerfull** that opposition turned out to be." (Anne Jarvis)

Oppostion toward constructivism

Perhaps because they have been taught science by teachers (and teacher educators) who ground teaching in some kind of transmission pedagogy, **learning** in science, from the perspective of the majority of students, has become the aquisition of facts ordered from the discipline. At the same time, science teaching, from the same perspective, has increasingly become the communication of **facts** from teachers to pupils so that pupils can understand these in ways which can be shown to be **correct**. Students expect to be taught science in these ways and also to learn how to teach it so.

Tom and Annes content didnt fit this ideal. Students couldnt accept the constructivist principles drawn up by Anne and Tom, not because they are opposed to constructivism (evidence shows they know little about it and tend to reduce it to "just another way of learning subjects) but because of the way Anne and Tom taught them to teach constructively on top of their current preconceptions. The deviant cases of positive appraisal of Anne and Toms content (positive appraisal by other than deviant cases) show this clearly.

> "Anne and Toms content was good in that it pointed out to us the need to put things to children in ways which they can understand. Thats why the pupil perspective is important. ..So that we can appreciate how difficult it is for pupils, especially some pupils, to understand complicted facts and their relationships and so that we transform what we know in ways which render these things understandable for them. ..The trouble was that they (Anne and Tom) didnt show us how to do this, ..thats why (we) students were critical of them." (Sylvia)

Anne and Tom wernt' just opposed by student convictions which didnt fit in with what they wanted to say. They were overrun by the intensity of student opposition to their teaching and the fact that this opposition was reinforced in other parts of the course, in the way the course was planned and developed, and in the way other tutors taught on the course; in short in what this course became at Baysfield and not simply that student opposition was there. Anne and Tom are unlikely to have helped their predicament however by promoting scientific method as a solution to teaching predicaments and anchoring curriculum theory to experimental problem solving as a means of exemplyfying this. A strategy which, from the objectivist/transmissionist perspective of the majority of students, tells them that science is about facts which are there and can be discovered. All but one of those interviewed seem to hold this perspective, a perspective which supports "transmission teaching" by further emphasising subject matter as comprising scientific truths and scientific truths as being objective facts.

Teacher education does more than leave students pre-formed understandings of science, of scientific knowledge and its production and of the teaching process unopposed, because, by organising instruction in such a way as is in some way concommitant with the "objectivist" position, teacher educators have also reinforced it in the eyes of students. Subject knowledge becomes more "objectified" not less in student eyes, and teaching becomes likewise less and less likely to be seen in terms of the politically value loaded discourse which it actually is and more and more likely to be seen in technical transmissionist terms.

This leaves the reformed teacher education programme, as "a critically reflective" teacher education, in a predicament. For whilst it may be wrong to reduce the intellectual activity of a society solely to the promotion of particular class-interests, separating such activity from its political and historic roots, as is seemingly the case here, renders it conceptually impossible to understand at the level of abstraction at which it is studied (see also Bourdieu and Passeron, 1977). Thus, rather than challenging teacher candidates **already** subverted understanding of the relationship between science, society and education, a teacher education which covers up the political bias of the knowledge produced by a society and the irrationalities of its (re)distribution within that society, would rather tend to confirm them. The critical has been dropped from critical reflection. At least in relation to the origins of scientific knowledge and its place thus within organised education.

There is no class, race and gender **malice** in the scientific knowledge produced by society in the eyes of students to begin with, even though that society is a class dominated (capitalist) patriachy, and teacher education serves to obscure such from them in the event that such does exist. As far as the politics of reform is concerned then, reforms become ways of "checking minor ills" in a system which is seen as primarily sound and just. A case of "dynamic conservatism" (Lindblad, 1980). Instead of looking for injustice and bias in the system itself, reflection is concerned with weedling out small problems in the operation of the system; that is with making it run more **effectively**.

Summary:

Students career biographies are couched in experiences of teaching as learners and not in teaching experiences as teachers. This means that their "professional consciousness", their personally organised knowledge which defines what teaching is as an activity for them, can only have evolved by them projecting their experiences of teaching as learners onto their teachers teaching intentions (in school, most recently upper-secondary school and now in teacher education). Something which is a perfectly **natural** thing for them to do (see also Schutz and Luckman, 1973).

> "From the outset ..I find in my life-world fellow men who appear not merely as organisms but as bodies endowed with consciousness, as men "like me". A fellow mans behaviour is ..action **"like mine"**. ..it is also self-evident to me that this articulation of nature and society that transcends me and him is the same, and consequently that his subjective meaning contexts as well as my subjectively experienced adumbrations and modes of apprehension are of an "Objective" order." (p15)

Indeed students still talk about their experiences of education as if it was **one experience** shared equally by all. Students, without knowing anything about a tutors (teachers) private feelings about education, (have) assume(d) nevertheless that their intentions have been "performance focused" and transmissionist because thats the perspective in which the student experience of teaching is couched. Teaching becomes a presentational exercise, even if it wasnt meant as one unless teacher educators make clear what their conscious purpose is and why (5). Students experiences of teaching in schools as pupils bring about this proclivity, and experiences in subject theory and methods on teacher education programmes, if they communicate technical facts and practical "tips", reinforce this kind of understanding.

For students, at the start of their teacher education careers, "teaching" involves the communication of (subject) facts which can be learned, applied and recalled, and therefore also tested, if it always has involved these things in their experience. Students then have a preformed understanding of teaching and the teaching subjects prior to teacher education in which both are seen in objectivist terms and (therefore) assumed to be politically neutral. Both scientists and teachers are seen by students as intellectuals who perform a type of labour that is detached from society; above it; in that the activity itself is seen as objective and apolitical. This has dire consequences for the development of a more extended form of professionalism as it diverts student attention away from concern for the political and social powers which have helped form both the disciplines themselves and the dominant theoretical traditions in education by reducing their relative significance in the eyes of students, on what it means to teach.

A teacher education programme which has "opted for" the conceptual neatness and administrative convenience of top dog organisational theory (Ball, 1987), and which therefore treats educational settings as mere **objects** of educational reform, cant deal with the kind of actor proclivity and actor involvment in shaping education in their own image which students and teacher educators have shown in this investigation. Students (and some teacher educators) will continue to see the things that go on in schools as sanctioned by **natural** laws untill that time that such is questioned by them. Teacher education administration can either assist or oppose the problematisation that leads thence. Untill such assumptions are made problematic (prospective) teachers have **no alternative** but to comply and passively go along with them. As Smyth (1989) puts it:

> "There is an important and compelling message here. If educational leaders and policy makers are concerned about educational reform, then they need to jettison the view that (schools) are like factories that only require revamped inspectorial systems, outcomes oriented effectiveness, and efficiency schemes, programme performance budgetting (PPB), management by objectives (MBO), competency based teacher education (CBTE), and other elements of the alphabet soup of educational reform. ...Professionalisation involves not only the status and compensation accorded to members of an occupation; it involves **the extent to which** members of that occupation **maintain control over the content of their work** and the degree to which society values the work of that ocupation." (p. 233, his emphases)

The failing politics of reform

Although the final outcomes of the reform are still distant, this investigation would indicate a powerfull conservation of recent developments in subject teacher education, in the form of such things as; more (appropriate) subject matter (the majority of students, BG, DT, CP & MO), greater expertise in the teaching subjects (ibid), and the extended development of subject pedagogic traditions which emphasise specific instructional skills of the kind which relate subject content to knowledge of childrens learning, growth and development (some students, esp. 1-7 students, AJ & TL). There is even evidence of transportation downward "through the grade system" and into preparation programmes for teachers for the lower and middle grades, of these recent subject teacher education traditions (see for example Emma and Barabaras text for a student perspective). And although the aims of this reform are ultimately to be felt in the school, or perhaps even society at large (prop. 84/85: 122), or even just perhaps because of this (6), this "downward tendancy" ought perhaps to be eyed with some concern.

In fact one can wonder just how radical the teacher education reform was in the eyes of those who originally promoted it and whether they see it as part of sweeping reforms or a reform which stands independently from these; on its own two feet so to speek? What did it set out to achieve and how was it meant to reach thence?

Perhaps the reform wasnt intended to be radical in the first place; or is it so that in the "plurality of values" which are represented within the organisation at Baysfield these radical ideas have simply been washed out? The ambiguity of policy documents on these points makes this a little difficult to ascertain. However, in the sense that students, educators and administrators at Baysfield, have avoided setting the content of their education into a reform political perspective; even in the face of glaring inequalities within Swedish society and between Swedish society and other societies, such as the particluarly oppressed sections of third world communities; radicalism can hardly have been part of teacher education reform at Baysfield, and one can only assume that actors havnt seen any radical intentionality in state documents and that they didnt see the insertion of radical perspectives as their task as teacher educators and prospective teachers, which were teaching to teach and learning how to teach respectively.

> "We have to prepare students to teach curriculum appropriate content in the comprehensive school. ..Its our responsibility to see to it than when they go out into schools as teachers that they can fit in with whats supposed to be going on in the departments they will teach in and also that they may influence departments in cases where that which is going on is out of line with the regulations for teaching in the compulsory comprehensive school. " (Chris Page, interview)

> "The school curriculum has guided the selection of subject content on the course more than anything else has. We have looked at the document to find out what teachers, particularly teachers in the middle age ranges, teach about. We have then used this as a base to decide what they (students) need to know about and what of that can reasonably be included in a course such as this one." (Dave Turpin, interview)

> "You cant include everything in subject theory on teacher education programmes, especially now since they (admin) have taken away so many of our (subject depts.) credits. ..What we have to do is select out that which is **most important for them** (students) to know in order to be able to teach according to curriculum regulations." (Geoff Pike)

> "We are not going to teach in the third world, although it could be fun and rewarding to go and help out there in some way for a short time. We are to become teachers in the comprehensive schools middle grades, all of us, both 1-7 and 4-9. It is important that we learn about the Swedish school system and how to teach in it" (Sylvia)

Perhaps educational reforms alone can never lead to changes in existing power relations in society and between societies. Carnoy and Levin (1976) and Whitty (1985) would certainly seem to be sceptical to the potential of educational reform in these directions and as Gustafsson (1981) reports there is little evidence that the recent "social reform" of Swedish education has had strikingly radical outcomes. Whitty (1985) does contend however, that educational reforms can lead to radical outcomes, in the event that they are followed by or conjugate with other reforms elsewhere within civil society which are forced forward by the professional body of educators, in cooperation with organisations outside of itself. In other words an educational reform may be reformist in the sense that it can function as a prerequisit for enabling power and economic relations in society to be changed by **both** the educational reform and **other** social reforms (Berg, 1989).

However, it doesnt seem as though Baysfields teacher educators and students are aware of the need for reforms to be reformist. Baysfield teacher educators seem to be more concerned about the material effects on their departments of educational change, whilst students are concerned with the practicalities of **performing** as a teacher within the Swedish educational system.

If this is so, then racial, class and gender issues, as these exist outside the four walls of classrooms, however much they may be influenced by the political nature of classroom discourse, are peripheral to that which students see as important for them to know and are peripheral to that which concerns teacher educators most at this present time. If this is the case then whose going to lift the shutters on sex, race and class at Baysfield and how is teacher education to become critically reflective?

Breaking "the big picture" against the epistemological foundations of knowledge which encapsulated this subject studies course at Baysfield

One of the principle aims of the course according to curriculum developers was the development of a big picture perspective. Indeed, as is communicated in the statements made by Chris Page and Ian Streak (p27-29), "the big picture" was meant to be both a point of departure and a pivotal point for curriculum development on the course. Indeed a shift from a traditional fragmented and materialistic world view in education where learning is viewed in terms of the transmission of generic concepts, towards one which is more "ecologcally" tuned and where learning is viewed as a practice in perception as well as or even rather than cognition (a totality perspective) is manifested on course syllabus at Baysfield for courses in general and not just for this science education course.

One could say that at policy text level a "broadened perspective" is a hallmark of teacher education reform at Baysfield and that (almost) all course syllabus bear testement to this. The "big picture" has also repeatedly been stressed in interviews by curriculum developers and an increasing recognition of the value of integrated and interdisciplinary studies, of which this physical science course is one example, can be noted at Baysfield, at least in terms of their "on paper" propensity.

However, there are two over-riding problems with this according to the data which has been collected. These emerge clearly in the respondent text summaries which are given in the report. For although focussing students attention on interconnections between what were formerly studied as separate entities (see Bill and Daves texts) might encourage them to adopt a more "ecological view" of their subject matter this is by no means certain. Indeed, as far as this investigation is concerned, no significant shift away from "objectivism" has been noted among students at Baysfield.

But then again, perhaps this isnt the intention. For, firstly, when giving accounts of curriculum development, teacher educators and curriculum administrators have (a) seemingly cut off from their considerations of curriculum development processes the social and political dimensions of knowledge production and reproduction pocesses and also (b) have deliberately excluded these, as irrelevances "on a (natural) science course" (IS), from their content. Teacher educators have also "gone their own way" (BG & AJ) when preparing content for the course.

The significance of these factors is that curriculum developers have then not been able to present anything which could be used to justify an "ecological point of departure" (ecopolitics, Gough 1989) as a viable **epistemological** alternative to scientific materialism. That is, as a viable alternative to scientific materialism for developing and testing theories about the origins of our planet, about matter and about energy. Something which is vital if students are to be able to fully understand the implications of the big picture perspective in connection to this course, and hold it together without relying on "reconstructing it from fragments of (scientific) knowledge" (Emma).

> "All the stuff was OK in the sense of subject content, that is subject matter from and about the independent subjects. The trouble was that it didnt hold together as an entity, tutors didnt manage to structure their content so that it was held together. It became up to us to reconstruct the big picture, or whatever they called it, ourselves from the pieces of knowledge they gave us." (Barabara)

> "There was obviously something lacking in the way we structured the subject matter. ..The big picture perspective was never really articulated and what seems to have happended is that subject tutors have gone their own way and developed content about the earth and universe, about energy and about matter from the perspective of their particular field. That is they seem to have looked at the titles and subtitles (on the course syllabus) and loaded these with the content from their particular discipline which they felt fitted that heading best." (Anne Jarvis, interview)

> "There was something lacking between the blocks of content and they dont seem to have hung together as well as we might have liked, but then again perhaps that wasnt such a bad thing. At least the students have been active in composing the big picture themselves." (Chris Page, inteview)

Rather than building up a sense of "wholeness" about the world and departing from this, teacher educators and curriculum administrators seem to have done quite the opposite and broken down the course into a series of subheadings, each of which was then "loaded" with content, by a particular subject expert or group of subject experts. And although in effect this "identification and separation of elements" was begun during syllabus work when the headings and subheadings, "as ways of giving structure to the content" (John Smiley, curriculum administrator), were drawn up, and that therefore course tutors can be interpreted as following a lead which had already been established "above", this kind of "follow-my-leader route finding" would be at loggerheads with what has been uncovered otherwise about the way involved persons actually do seem to participate in organised education and in planning organised education. It wouldnt "allow" them to participate in ways which would allow them lend their own expressiveness to the education and make it more "palatible" in their eyes. Furthermore, those interviewed seemed to feel that structuring content in this way was a natural way to approach the course. It certainly would seem to be one they are used to; especially at the university subject departments.

It would seem more likely then, then that tutors and curriculum administrators still seem to feel that "ecological" knowledge should be subjected to the "system of rigour" of the scientific materialist paradigm. In subjecting curriculum development to the "oversight" of **subject experts**, they convey this clearly in their actions to students who are more than well prepared to accept that paradigm and to apply it to their teacher education.

> "Even though its a big picture perspective the knowledge which is communicated still has to rest on scientific foundations. ..The course, in fact all teacher education, is meant to rest on both proven experience and scientific grounds." (Thomas, inteview)

Thomas is not an exception on this point, in fact, with the possible exception of the (politically) active environmentalists such as Bob and Diane; and this is very clear in the text summaries; students, when they have defended "the big picture approach" in relation to this course, have done so in what are essentially scientific materialist terms. That is in terms of it being for example,

> "Perhaps a more interesting way of communicating facts and knowledge about environmental problems (and a way) which renders subject matter in school more accessible to pupils by choosing to focus upon everyday types of thing. The weather, household chemicals, smog and so on. ..Things pupils meet everyday (and can relate to)." (Sylvia)

This way of "breaking the big picture" against the epistemological foundations of traditional types of subject content is in fact damaging for the ecopolitical forcefullness of the course. For, although the big picture is seen as dealing with knowledge about something other than "striaght physics or chemistry" (Dave), it is still, in the eyes of students, about the mediation of "scientifically" established facts and knowledge. Facts and knowledge which may be more "interesting" and more "accessible" in a sense but which nevertheless only represent just another way of gathering or studying **the same type of knowledge**.

In a sense the big picture perspective has been reduced to some kind of environmental studies course rather than being promoted as a form of scientific inquiry; and the study of its product; which derives from an alternative kind of science to scientific materialism. In fact whether or not the involved teacher educators and curriculum administrators themselves have seen knowledge in "the big picture" in politically and epistemologically different terms to the type of knowledge arrived at by studies which are carried out in the traditional mainstream paradigm of scientific materialism and normally communicated to students in "mainstream" (teacher) education may be open to question. I would say that the evidence indicates that they have not.

In any event, curriculum developers seem to have done little to justify the big picture approach in an epistemological sense and its viability as an alternative to more traditional fragmented or atomistic curriculum development activites has therefore not been politically and epistemologically proven to students. The perspective has had little more to **hold it together** in their eyes than the "reality near" orienterings perspective of the school curriculum and little more to justify it than curriculum recommendations and, at least for Chris and Maureens content, the pertinance of a content ordered according to the permanancy of matter in the course perspective of ecological survival. In other words, the big picture approach has become justifiable in a "professional" sense, as a way of "framing" educational knowledge (Bernstein, in Young, 1971), but not in a fundamental one, as the pedagogy of an alternative epistemological tradition to scientific materialism.

This doesnt mean that the course has been a bad one or that the "big picture" innovation as established at Baysfield doesnt have a great deal to recommend it in a professional sense when compared to more sterile types of traditional subject theory. Rather just that it hasnt fulfilled the political potential of the "big picture alternative" as perhaps Gough (1989) for example, would have it.

For instance the course hasnt been intended by curriculum adminstrators and teacher educators to be developed with the **sole** notion of subject matter mastery in mind; as perhaps with "trditional" subject theory (Arfwedsson, 1988); neither have students appreciated it solely in these terms. Rather it has been intended to have, and has been seen by students as having, a purpose beyond that. And even though it is in the sense of the value of the communicated subject content which most of those interviewed have most often justified it, the justification usually goes further than **just** that. Students, as argued earlier, in that they seem see the knowledge communicated in education.as having some kind of universal validity due to some kind of intrinsic value of a politically neutral content of instruction, have still seen the parts of the course which communicate facts as valid, and valid because of this, and this seems to have been true even in cases where its **particular** value to prospective teachers of the middle grades is doubted. But it was **particularly** true where this is beyond doubt.

> "The subject matter content which Bill Giles (and Dave Turpin) taught us was very very good and very very interesting. I really did learn alot there and would have really liked more time on those subjects. ..Even though we didnt have any direct use for the things they taught us, ..directly, in the sense that we could use them directly in the classroom, ..or even indirectly perhaps in that they didnt always seem to link directly to what we are likely to be teaching in the middle grades, ..it is never wrong to learn things, ..to aquire new knowledge. Thats my belief at least!" (Jane, interview)

> "The course began so well with Bill and Daves physics and geography. Admittedly the tempo was a bit high but we got good literature references, especially from Dave, and the stuff they taught us was all usefull from the point of view of being able to build up a scientific understanding of the physical environment. ..I dont believe in the idea of teaching about a "large and general picture" in the sense that we look at a broad picture only. You have to break this down if you are going to be able to understand it and how it works. ..You cant understand how the elements were formed after the big bang unless you know things like beta-decomposition ..and you cant get away from that. ..Bill and Dave did the right thing by showing us how things were interelated and giving us some orientation as to how the things they taught us were significant to the big picture and then breaking these down in these ways." (Steve, interview)

> "It was meant to be a science course not a social studies course and the big picture approach is an ecological one not a sociological one. The stuff they (Bill, Dave and Barry) taught us were good and usefull facts which we then had to use in order to build up a picture of the world. This meant that we were active and that the course rested on scientific foundations, as it should. ..Theres nothing to be gained by just speculating. Science has proven certain things, ..theres no point in reinventing the wheel." (Thomas, interview)

> "The course was a pretty good one I thought, although I know not everyone would agree with me. ..Even Dave Turpins part was good ..I enjoyed it because it was interesting and to do with things which everyone is familiar with in some respect. The weather for instance, everyone knows about the weather and can discuss the weather, ..Dave went further than that though, now we can discuss the weather and know why we get the kind of weather we do and we can distinguish between things like weather and climate how human activity effects or may effect climate and so on ...and the reverse of course. Thats the kinds of thing you can and perhaps should teach in school. Facts which are interesting to know and usefull to know. You can start with the facts like today its raining and work through to why it rains, why its raining today, where it rains most and what the consequences of these things are. ..It wasnt all a waste of time at all, like some have said, quite the opposite." (Pete, interview)

The educational consequences of an ecopolitical viewpoint

According to Chris Page, Bill Giles, Dave Turpin and Anne Jarvis the rationale of the course in question was one where students were encouraged to study the ways in which science technology and society are interelated, for example:

> "Newtons Laws, machines and human activity are meant to be presented on the course in terms of their interelations rather than as separate elements." (Bill Giles, interview)

> "I saw the physical geography contribution as one which could form a bridge for the other sciences ..between the other sciences and even over into the social studies block. I think this is important,

> ..teachers need tc be able to see the interrelatedness of nature and forms of human activity." (Dave Turpin, interview)

> "What we tried to get across to them was that the things we do in the name of technology have consequences for continuing life on the planet.. ..It would be ludicrous to try and say that technology is bad and that wed' all be better of living as we did in the past. What we need to get over is that technology doesnt operate in a vacuum and does have effects, bad and good, on the environment." (Chris Page)

This is also the kind of rationale for some (most) of the STS work caried out by Driver and her associates at Leeds University in England which has, according to Anne Jarvis, directly inspired some of the work at the Baysfield Department of Educational Research with which she has been associated. However, although this content can be set into an ecological world view perspective, this might, at Baysfield, as yet be a superficial manifestation only; at least within teacher education. In fact, as was dwelled upon on two occaisions previously, a large part (social and political) of the ecological world view has been left out of consideration when considering content for this course (see for example Hubendick, 1986). Let me elucidate.

According to interviews and respondent validated texts students still encourage transmission pedagogies and the mediation of "correct solutions to problems" (also Beach, 1989) and few students as yet appear to associate to an ecological world view, and of those who might be assumed to be moving in this direction, none highlight this as having embraced the course in question. In fact one of them (Bob) criticised it because it actually neglected to promote this kind of a view and was rather steriotypically fragmentory in his opinion.

According to Bob the major aspiration of Green Politics inspired curricula (a movement with which Bob claimed to be involved) is.

> "The renewal of an ecological world view through the development of views of knowledge which are holistic and "personally structured" as opposed to atomistic and theoretically (or technically) restructured",

According to Bob these types of issue were totally neglected during the course and actively discouraged in the final examination where such a view was actually "more likely to have been actively discriminated against by the form of evaluation employed" (Janice).

Bob and Janice (see also Emma and Barbaras text) would seem to indicate that transmission pedagogies characterise the course.

> "Facts ordered directly from the discipline were mediated directly to students and tested in an after the fact manner". (Bob)

> "We (students) werent able to build our own picture of the physical world and its ludicrous to try to suggest that we could. ..We knew that the final examination would actually assume one particular type of understanding, ..that of the tutor who had set the question, and that what we had to do was come up with the answers he or she wanted. ...We were playing a guessing game. We werent being asked to build up a "big picture" of the physical world! What we actually were doing was recreating their picture (tutors) from the fragments of information which they felt were the important things in relation to the three overriding themes on the course" (Sandra, interview)

Old wine in new bottles

There are undoubtably many reasons why the notions of holism and interdependency havnt' been able to filter through the bricolage of the course in the ways which according to Ian Streak and Chris Page (pp27-29) one could assume they were meant to. Not the least that holism and interdependency, where this represents a paradigmatic stance, might not be acceptable to some students and teacher educators. In any event, if the intentions were genuinely to promote "ecological" forms of understanding, these are not **reaching** students in teaching settings. And although this is surely at least in part due to the kind of student conservatism which arises out of their (biographically rooted) expectations of the course (see earlier section on student biography); perhaps even Bob was looking to be **told** how to teach ecopolitically; this is probably only a part of the story. In some cases at least, the curriculum practices of teacher educators, as they and students have expressed these as being in their accounts of the course (see text summaries), would definitely seem to be at loggerheads with the kind of strategies one might associate with holism.

For instance, Bill and Dave "search the disciplines first" for suitable content for courses (see Bills text) and thus seek to mediate the products of the "confident scientific materialism of the recent past" (Gough, 1989). In that way they cling to transmission pedagogies and in so doing not only preserve the teaching practices and learning experiences that go with a fragmented world view, but also, in view of student biography, **reinforce** among students, views of knowledge concommitent to the traditional discipline centered standpoint, by not actively seeking to refute (or at least problematise) the reproduction in classrooms of knowledge produced in the scientific materialist tradition (7). Something which would obviously work in opposition to any kind of holism.

This particular criticism is obviously not as directly relevant to Anne and Tom and Chris and Maureen. Anne and Tom for example, **have** tried to render the reproduction of knowledge in classrooms problematic, at least from a constructivist perspective. Anne actually talks about using controversial issues in teacher education and actually seems to see the development of prospective teachers reasoning skills as the legitimate "aim" of teacher education.

> "We have to look away from the mediation of facts as an end in itself and toward developing students reasoning skills. ..The use of controversial issues in teaching, as there are no known and clearly unproblematic 'right' answers, would extend opportunities for discussion by infusing alternative points of view. By concentrating on being critical and analytical towards these things ourselves (t.educators), rather than assuming we have the right answers, we can help this process by protecting, in a sense, any diversity of opinion and safeguard that standards of reasoning are maintained as the matters of concern in teacher education settings." (Anne Jarvis, interview)

Also Chris and Maureen, this time from the orienterings perspective of the schools national curriculum, have seriously questioned the suitability of traditional disciplinary content for transmission in teacher education subject studies.

> "The content of university science courses has never been suitable for teachers for the comprehensive school. ..The comprehensive school is not an elite school and not part of the "preparatory" system for university study that the real (grammar) school was. ..University educators dont seem to take this into account. ..University courses in chemistry tempt students to teach watered down versions of university courses in schools. Which they shouldnt! Also, by concentrating on kinds of things like average bond enthalpies (8), the university chemistry courses take time from, or worse even leave out, the kind of content which prospective teachers subject studies courses should concentrate upon." (Chris Page, interview)

However, both Anne and Tom and Chris and Maureen, help to undermine the significance of the big picture perspective in other ways. These educators, and particularly Anne and Tom, emphasise the scientific method as a means to resolve teaching dilemnas and neither of the two pairs of tutors seem inclined to openly refute scientific materialism as a reasonable means of gaining insight into how things are in the world. Quite the opposite they seem very contrite to infuse the materialist scientific perspective into the framework of the courses they become involved with. This can only be due to a reluctance on their part to accept an ecological world view, such as ecopolitics, as a worthy **paradigmatic alternative** to scientific materialism and a reluctance to see the intuitive and perceptual, ecologically won knowledge, as a product worthy for school classrooms.

> "We are very concerned about providing a scientific basis upon which they (prospective teachers) can develop their knowledge about teaching. ..We want them to build a workable theory around which they can organise their teaching and against which they can test their experience. ..Of course we could stand in front of them and show them what to do and how to teach but how would that leave them when they go out into teaching. We need to develop something renewable which they

> can then extend. Thats why we are so intent on getting across such things as systematic and analytical thinking, experimental methods and so on. ..The education has to be built on **both** scientific knowledge and proven experience not one or the other, and thats all parts of the course not just subject theory or educational theory but even curriculum theory (didaktik). We cant just stand and talk about classroom anecdotes! We have to infuse the scientific aspect as well." (Tom Lupton, interview)

> "We tried to build alot of our work around the idea of developing systematic thinking among the students. ..There is a place for systematic approaches to teaching, many classroom problems can be solved by applying analytical approaches, ..a problem solving approach." (Anne Jarvis, interview)

> "It wasnt just that they were asking us to look at experimental problem solving in relation to how batteries work and such like, that would be too primitive, I mean we all knew that already, ..or should do, weve all got three years gymnasium science behind us. What they wanted us to do was look at the way of experimental problem solving, its composition so to speak, a way of applying systematic thought processes to the solution of everyday problems." (Sandra, interview)

However, one cant sweep by the predisposition of a great many science students to "reduce" all that is catalogued under the term "science" to a scientific materialist framework, and there is a risk therefore, that Anne and Toms concern to make professional studies more "scientific", can become just another case of objectivism; especially if students read the message as one which says that the classroom can be broken down for study into discrete variables, and further, that knowledge about the whole of teaching can be reconstructed from knowledge of its various parts. In such a case Anne and Tom would be promoting (from that students perspective) the atomism of scientific materialism as the basis from which teachers can account for classroom events.

This is in direct oppostion to the big picture perspective. Anne and Tom would actually be reinforcing the epistemological statutes of the scientific materialist paradigm and furthermore showing how that paradigm, a paradigm with which the "holistic" big picture approach is incompatible, is relevant to classroom study.

Epilogue: What knowledge is of most worth?

Going "big picture" at the same time as a scientific basis is to be **infused** into the "professional" components of teacher education programmes, may not in retrospect have been so bright a move on the part of authority as the two in a sense work against eachother from the scientific materialist perspective. The perspective which most students and teacher educators at this time seem most willing and most likely to adopt. Preconceived scientific materialism interprets the infusion of "correct subject facts" and "correct approaches to teaching" about these as the infusion of a scientific basis for teacher education and the paragdgmatic status of "the big picture **aternative" is reduced** to fit in with this. The big picture alternative becomes (or perhaps remains) another way of selecting and presenting the objective and irrefutable facts of the subject in educational settings. For "professional studies", this amounts to restricting prospective teachers consideration of educational events to a consideration of measurably determinable classroom variables (IQ, ethnicity, sex, class) which are used in order **to account for or even predict** learning outcomes in relation to particular subject content (9).

On the other hand the intentions with the big picture perspective might have been more in line with the big picture approach as "a more palatable way" of presenting traditional subject matter content (Gough, 1989). *Cases of old wine into new bottles* (Richmond, 1970).

> "Certainly the ranging of content from the general to the more specific is a plausible way of structuring learning experiences and perhaps in a **motivational sense** it may well have alot going for it. I have nothing against the approach and as far as learning subject content is concerned, there is probably nothing which says that one or the other way of doing it should give better results." (Bill Giles)

> "We tried to arrange subject matter in a new perspective, ..instead of starting with lots of tiny small problems and building these upwards and outwards in the more common way, we started with broad overarching problems and interelationships and tried to follow these inwards. Although I dont feel we were as successfull as we had hoped theres nothing of disadvantge in the approach to structuring and teaching subject matter in this way." (Anne Jarvis)

What these two statements imply is that teacher educators have used their knowledge to tell and show students **what** is significant in the physical environment and also, in some cases, **how** to deal with this in classrooms from the orienterings perspective of the schools national curriculum. A perspective which both students and tutors have **chosen** to interpret as a "holist perspective", but which need not necessarily be so and certainly isnt from the perspectives of ecopolitics or the critical sociology of knowledge. Furthermore, the type of intentionality behind the course which tutors signify in statements like the above, would contribute toward "fencing it off" into areas of subject responsibility. Something which undermines the status of holist knowledge and ecopolitics, by subsuming the perspective in which ecological knowledge actually is formed, to the same frame of reference as that of the materialist forms of knowledge which undergird competing ideologies such as marxism and capitalism. As Gough (1989) says, such is an example of;

> "..lip service to the practices and experiences which exemplify an ecopolitical paradigm ..(which) fail to achieve any significant changes in the purposes of learning and the disposition of the learner. ..Practices which appear to be consistent with an ecopoliticl paradigm can be used simply to try to provide a more attractive route to achieving the objects typical of an epistemological paradigm (10). Incorporating "reality centered projects", "community settings" and the "cooperation of learners" into educational programmes does not necessarily serve an "education of attention" but rather may merely make the transmission of existing theoretic knowledge seem more palatible." (Gough, 1989, p.239)

Curriculum developers involved with the physical world course certainly seem to be more concerned with the palatibility of current theoretical knowledge about the world rather than being primarily concerned with political dispositions. The intention to run a big picture course **separate from sociological and political considerations** as a first priority, as was intended (Ian Streak), indicates this quite clearly. It might be that students, teacher educators and curriculum administrators consider the epistemological paradigm as the only workable alternative at this stage, they may even refute the credibility of the ecopolitical and critical (sociology of knowledge) alternatives.

However, if radical educational change is intended by administrators and teacher educators at Baysfield to ensue from the teacher education reform act, an alternative to liberalist learner centric education as an alternative to the dehistorising bearing of subject teacher educating; as both frame teaching in politically neutral imagery; must be found. The ensuent change has to be more than the "merger" of two traditions of teacher education. The question which must be posed dates from Spencer; **What knowledge is of most worth (to teacher education)?** However, I would like to add a postscript; Whose knowledge and why? I would contend that these are questions which educational debate at Baysfield seems to have passed over rather too hastily.

A second question, which isnt unrelated to the first, is that of the possible role "administration" (at Baysfield) might or could take in the articulation of reformed teacher education in a (partially) decentralised system. In fact, as Smyth (1989) puts it, the legitimate funtion of administrators may be one of the more "perplexing issues" connected to deceneralised teacher education. Should local administration make use of decentralisation and seek ways to help other participants in the educational organisation find a wider sense of community by helping them identify the values within the organisation which might be meaningfull to them, thus enabling them to shape teacher education in their own image? Or is the role to be as before, one of "unproblematic authority", with maintaining the deep social structures which have been played out previously in teacher educating rather than transforming these. If the former is to be the keynote of concern then what administrators need to do is help other participants to come to understand their work and make sense of what they do.

> "To orient themselves towards reflecting on the limits they face and how those aspects that restrain their range of choice might be overcome." (Smyth, 1989, p220)

If however, the interest is more in line with a "management" tradition and for authority and control, then in line with Sharp and Green (1975), what would become significant at the last analysis would be questions of how to bring sanctions to bear on others irrespective of their definition of reality. For instance administration would seek ways to sanction the behaviour of ancillary staff, teacher educators and students (timetables, schedules and a "controled and evalauble" division of labour); teacher educators would seek to sanction the behaviour of students (as with objective testing and obligatory attendence) and students (as prospective teachers) would seek ways which would enable them to control classrooms and pupils (aquiring knowledge for transmission and ways of doing so). In one way or another alot of this course may have sought ways in which to accomplish these things.

Notes

Note. 1. Excluding immigrant language combination variations and Swedish plus Swedish as a foreign language (SFL).

Note. 2. Slightly less than 10% if the upper-secondary technology course (T) is taken instead of the science course (N).

Note. 3. This top down notion is the one understood by actors to be intended and operative. ie.Top down organisational theory approaches to curriculum development are theirs not mine. These have been disclosed through the investigation which is meant to be symbolic interactionist.

Note. 4. Even communism and capitalism as two examples of scientific materialism exhibit an ideological stability in that they rest upon the same kinds of epistemological assumption

Note. 5. A bit like in the McArthur witch-hunt, rather than students seeking evidence to proove that a teacher educator is a transmissionist a teacher educator has to give evidence to proove that he or she is not a transmissionist.

Note. 6. In all cases where the standard of achievement is regarded as the "mastery" of (some) subject content an appreciation of how complex stritified societies penetrate schooling is missed. In however "progressive" a form subject centered educating is applied its ends can only be some form of conservatism which derives from its automatic promotion of a static social order.

Note. 7. As 5.

Note. 8. For a diatomic molecule XY, the bond enthalpy ΔH is defined as the enthalpy change for the process;

$$X\text{-}Y[g] = X[g] + Y[g]$$

For a polyatomic molecule, with two Y atoms and one X, the average bond enthalpy is defined as half the enthalpy change for the process;

$$Y\text{-}X\text{-}Y[g] = X[g] + 2Y[g]$$

Note. 9. Perhaps (Baysfields curriculum theory) didaktik is is similarly reductionist in its relationship to professional practices as scientific materialism is to the big picture perspective.

Note. 10. Goughs term for the mainstream educational paradigm (-DB).

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